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New Hampshire Coastal Zone Management Program

PORTSMOUTH PORT REGION DEVELOPMENT STUDY
TASK I: ASSESSMENT

Final Report

Prepared for:

OFFICE OF STATE PLANNING
STATE OF NEW HAMPSHIRE
2 1/2 BEACON STREET
CONCORD, NEW HAMPSHIRE 03301

Prepared by:

TEMPLE, BARKER & SLOANE, INC.
33 HAYDEN AVENUE
LEXINGTON, MASSACHUSETTS 02173

in conjunction with

SEAREACH
27 CONGRESS STREET
SALEM, MASSACHUSETTS 01970

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I. EXECUTIVE SUMMARY

A. INTRODUCTION

The objectives of the Task I: Assessment effort were to inventory and assess the economic potential of the Portsmouth Port Region (PPR). The accomplish this objective four major tasks were performed:

I: Develop an overview of Piscataqua River

II: Survey port and harbor facilities and assess current trends in shipping activity

III: Provide a competitive analysis of the PPR

IV: Survey existing land uses

Supporting data for these analyses were obtained from a review of existing literature on the PPR and interviews with port users and interested parties.

This draft report presents the consultants preliminary findings. The detailed findings of the Task I analysis are presented in Chapter II. This chapter presents an abbreviated summary of the principal findings.

B. FINDINGS

Piscataqua River

- The Piscataqua River provides ample draft for both the commercial vessels calling at industrial facilities and tour, party and recreational boats located along the river.
- Channel widths restrict somewhat the use of assisting tugs alongside large vessels, particularly in maneuvering through bridges.
- Bridge and overhead cable clearances are adequate for the commercial fleet calling at the PPR. However, bridge heights present some restrictions for commercial fishing and recreational boats in interchannel areas.

- The high velocity of tidal currents constrains the maneuvering of deep draft vessels (greater than 27 feet) to navigation on a flood tide. Tidal currents also restrict fishing and recreational vessels in open water areas.

Port Facilities

- Existing general cargo and container operations are adequately served at the Port Authority Pier. The estimated terminal storage capacity of 300,000 tons significantly exceeds the 150,000-200,000 tons of scrap metal, general and containerized cargoes that are handled at the facility annually.

- Berth utilization rates during the past four years have equaled the estimated maximum attainable for a single berth facility without incurring significant delays.

- Increases in vessel calls, particularly by regularly scheduled vessels, could result in increased vessel delays. These delays would have a negative impact on the Port Authority's ability to attract and maintain additional ocean services.

- Improvements in vessel turnaround, particularly for scrap ships, would lower berth utilization and permit accommodation of increased vessel calls. However, this would necessitate working additional shifts on scrap ships which would increase stevedoring costs.

- Dry and liquid bulk storage capacity appears ample for the traffic volumes handled.

- Extension and improvement of the existing Port Authority facilities could significantly improve alternative uses of State facilities for activities such as tourboats and reduce conflicts.

- Extension or additions of facilities for both commercial fishing and recreational boating could accommodate unfilled demand.

Economic Profile of Port of Portsmouth Activities

- Industrial activities along the Piscataqua River employ an estimated 770 people and provide a

significant economic return to the Portsmouth Port region. This economic return includes corporation profit taxes, expenditures for goods and services in the Portsmouth Port Region, and property taxes (an estimated $910,000 in 1984).

- Commercial fishing activity in the State of New Hampshire is concentrated in the PPR and its contribution is estimated at $4.5 million to the local economy.

- Recreational boating activity in the river contributes an estimated $1.6 million annually to the local community.

- Tourist activity, which includes museums, theaters, festivals, and harbor tours contributes an estimated $5 million annually to the PPR and provides an economic base for the entire coastal region.

- Each of these activities is expected to increase significantly in the future, requiring careful facilities planning if the return these activities generate are to continue to be realized.

- Recent economic growth in the PPR, as measured by population, employment, housing, and industrial/commercial activities, is projected to continue. This will place additional demands on existing non-industrial waterfront facilities.

Shipping Trends

- Deregulation of the U.S. transportation industry has resulted in a significant restructuring of ocean services and rates.

- Ocean carriers have expanded their services from the provision of port-to-port services to door-to-door services involving multiple modes of transportation.

- Coincidental with these expanded services, a restructuring of rates has effectively shifted the cargo routing decision from the shipper to the ocean carrier.

- Current intermodal door to door rates are "port blind," i.e., they do not recognize the historic transport economies associated with shipping via local ports. Economies of scale associated with use of load center ports and volume contract rates are the principal factors contributing to these rates.

- In addition to intermodal rates, the proliferation of non-conference carriers offering discounted rates has impacted the cargo routing decision of shippers.

- The net impact of these rate trends has been the diversion of New Hampshire cargoes to New York and Montreal.

- The principal advantages of the Port Authority in attracting additional cargoes are:

  --Efficient receipt/delivery of cargoes

  --Personalized service

  --Accessibility

  --Competitive ocean carrier service frequencies and transit times to the UK/Continent

  --Foreign trade zone services

- The principal disadvantages of the Port Authority for attracting additional cargoes are:

  --Physical: single berth facility

  --Economic: Intermodal and non-conference rates

  --Market: Lack of multiple ocean carriers services

  --Institutional: Historical lack of support from the State, particularly as it relates to promoting the Port Authority

Competitive Stance of the PPR

- Competition among New England and other major North Atlantic ports is focused on container cargoes. New York and Montreal are the two biggest competitors for

New England container cargoes. Boston is the principal intraregional competitor of Portsmouth for New Hampshire cargoes.

- New York, Boston, and Montreal offer more ocean carrier services, broader geographic coverage, higher service frequencies, and faster transit times with the exception of UK/Continent services, and potentially lower costs through intermodal rates.

- However, access to these ports are more difficult.

- Both New York and Boston are state agencies with diversified revenue streams from the operation of airports, bridges, tunnels, and other public services. Both of these ports subsidize their marine operations with revenues from non-marine activities.

- Montreal is a federal agency, but has been self-sufficient in terms of funding for the past five years. Montreal's revenues are concentrated in maritime activities.

- Commercial fishing, tourism, and recreational boating activities all offer growth and development opportunities to the PPR and all compete for scarce waterfront resources.

- Commercial fish landings have more than doubled since 1977 and vessels utilizing the State fish pier have increased at 10 percent per year over the recent past. This growth has put pressure on the existing facilities.

- Recreational boating has grown at a rate of 8 percent per year over the recent past, twice the national trend. There are many pressures from each of facilities and a continuous waiting list for over 150 boats.

- Tourism provides the state with 10 percent of its gross income and 11 percent of its employment. Growth rates evidence significant local growth and the need to provide waterfront facilities for tourism-related activities.

- General development pressure associated with population increases in the coastal areas threatens to consume remaining waterfront areas.

- A scarcity of undeveloped waterfront land, existing uses, and public priorities all serve as constraints to alternative development opportunities.

Land Use

- Existing land uses in the towns of Newington, Portsmouth, and New Castle are diverse and non-uniform; i.e., industrial, commercial, recreational, and residential uses comingle and encroach on one another.

- Land use within the town of Newington (industrial) and New Castle (residential) provide the most uniformity. Newington contains the largest tracts of undeveloped, although potentially unavailable, sites.

- Land use within Portsmouth is in a mature state, with existing uses firmly entrenched as a result of historic precedence, zoning, and public decrees. These entrenched uses will create increasing conflicts as growth continues.

II. TASK I: ASSESSMENT

A. LITERATURE REVIEW

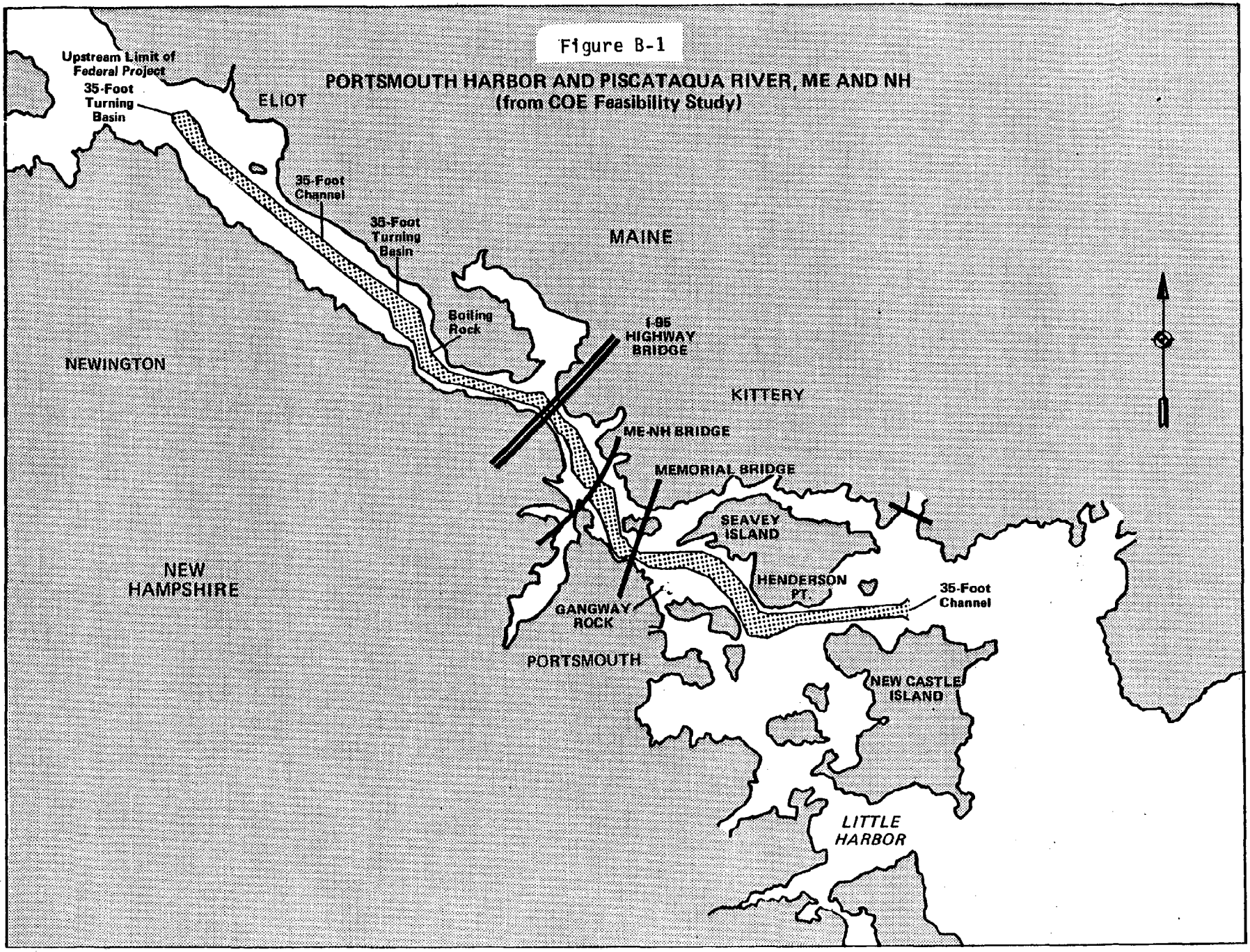
The initial step in the conduct of the Task I: Assessment analysis was a review of existing literature for the Portsmouth Port Region. The consultants review of the literature was conducted in two steps--the first was a review of an annotated bibliography of existing literature prepared by the Office of State Planning of the State of New Hampshire which provided a brief synopsis of each document; the second was a review of studies providing relevant statistical data and background information. Data obtained from the literature review task has been incorporated throughout the remainder of this report.

B. OVERVIEW OF THE PISCATAQUA RIVER

The Piscataqua River, formed by the confluence of the Cocheco and the Salmon Falls Rivers, flows southeasterly for approximately 13 miles where it enters the Atlantic Ocean at Portsmouth Harbor. The river drains the Great Bay estuary and is tidal over its entire length, with an average tidal range at Portsmouth Harbor of 8.4 feet and an average mean spring range of 9.7 feet. Currents in the river are unusually rapid, with velocities in the main harbor ranging from 2.6 to 4.0 knots at full strength. Water quality in the river is generally good, primarily due to the extent of exchange between the Atlantic Ocean and the Great Bay estuary. The river is designated as a Class B segment by the State of New Hampshire, acceptable for bathing and other recreational uses, fish habitat, and public water supply after adequate treatment.

The 35 foot-deep commercial channel of the Piscataqua River extends 6.2 miles from deep water at Portsmouth Harbor to a point 1,700 feet above the Sprague Dock in Newington, as shown in Figure 1. The channel is generally 400 feet wide, with additional width at bends in the vicinity of Henderson Point, Gangway Rock, Badgers Island, the Maine-New Hampshire Interstate Bridge, and Boiling Rock. There are two turning basins; one, 950 feet wide, is located just above Boiling Rock, while the other is 850 feet wide and is located at the head of the maintained channel (see Figure B-1).

Figure B-1


PORTSMOUTH HARBOR AND PISCATAQUA RIVER, ME AND NH
(from COE Feasibility Study)
Upstream Limit of Federal Project
35-Foot Turning Basin
ELIOT
35-Foot Channel
35-Foot Turning Basin
MAINE
Boiling Rock
I-95 HIGHWAY BRIDGE
NEWINGTON
KITTERY
ME-NH BRIDGE
MEMORIAL BRIDGE
SEAVEY ISLAND
NEW HAMPSHIRE
HENDERSON PT.
35-Foot Channel
GANGWAY ROCK
PORTSMOUTH
NEW CASTLE ISLAND
LITTLE HARBOR

While the maintained channel depth of 35 feet is adequate for the range of vessels calling the Portsmouth Port Region, vessels with drafts in excess of 27 feet are maneuvered safely only at flood tide. Because of the deep draft and fast currents, such vessels can only be turned with the tide.

The rapid current creates potential navigation hazards, particularly for the increasingly larger tankers visiting petroleum terminals on the river. As tugs are necessary on both sides of large vessels in order to navigate sharp turns, channel widths are somewhat constraining. The Army Corps of Engineers has recommended creating a 35-foot deep emergency maneuvering area between the two vertical lift bridges by widening the channel from 600 feet to 1,000 feet; widening, by 100 feet, the northern limit of the channel adjacent to Badgers Island; and widening the southern limit of the channel at Goat Island from 400 to 500 feet. Interviews with Portsmouth navigators indicates such improvements would facilitate navigation.

Three bridges cross the commercial channel of the Piscataqua River. Memorial Bridge, between the City of Portsmouth and Badgers Island, is a lift bridge with a horizontal clearance of 260 feet and a vertical clearance of 150 feet. The Maine-New Hampshire Interstate Bridge, between Nobles Island and Kittery, is also a lift bridge with a horizontal clearance of 200 feet and a vertical clearance of 135 feet. However, because of the angle of vessel approach necessary to offset currents in the area, the effective horizontal clearance of the Interstate Bridge is reduced to approximately 140 feet. The I-95 bridge has a horizontal clearance of 440 feet and a vertical clearance of 135 feet, creating a potential navigation hazard since the clearance is not adequate for a large vessel to pass with tugs on both sides. The potential for mechanical failure of either of the two lift bridges is of particular concern, especially since all cargo terminals are located upriver of Memorial Bridge and most, including all the petroleum terminals, are located upriver of both bridges. Cable crossing areas straddle the Memorial Bridge and the Interstate Bridge; there are also three cable crossing areas in deep water seaward of Portsmouth Harbor.

Numerous submarine cables cross the Piscataqua River at various locations between the mouth of the river and Newington, including in the vicinity of Wood, Badgers, and Nobles Islands. Overhead power cables with a vertical clearance of 165 feet cross the river at Piscataqua. Neither the submarine nor the overhead cables pose a constraint to the safe navigation of commercial vessels. In an emergency situation, the submarine cables could restrict a vessel's ability to anchor.

Salt and tidal marshes are located along the Piscataqua River in Little Harbor and Sagamore Creek throughout the Great Bay estuary. These areas are environmentally sensitive areas as it relates to development. Based on the history of the Portsmouth area, the potential exists for historic period shipwrecks within Portsmouth Harbor or in the Piscataqua River, particularly in the areas immediately adjacent to Badgers Island and Goat Island.

C. PROFILE OF THE PORTSMOUTH PORT REGION

1. Port Profile

Exhibit C-1 presents an inventory of major commercial marine facilities located along the New Hampshire side of Piscataqua River, with locations identified on Figure C-1. Commercial marine facilities include four petroleum terminals, one general cargo terminal, two dry bulk terminals, a specialty terminal, two cruise line docks, the State Fish Pier, and facilities for berthing tugboats and environmental research vessels. Several of the terminals serve more than one user. Operational capabilities of the principal terminals are described below.

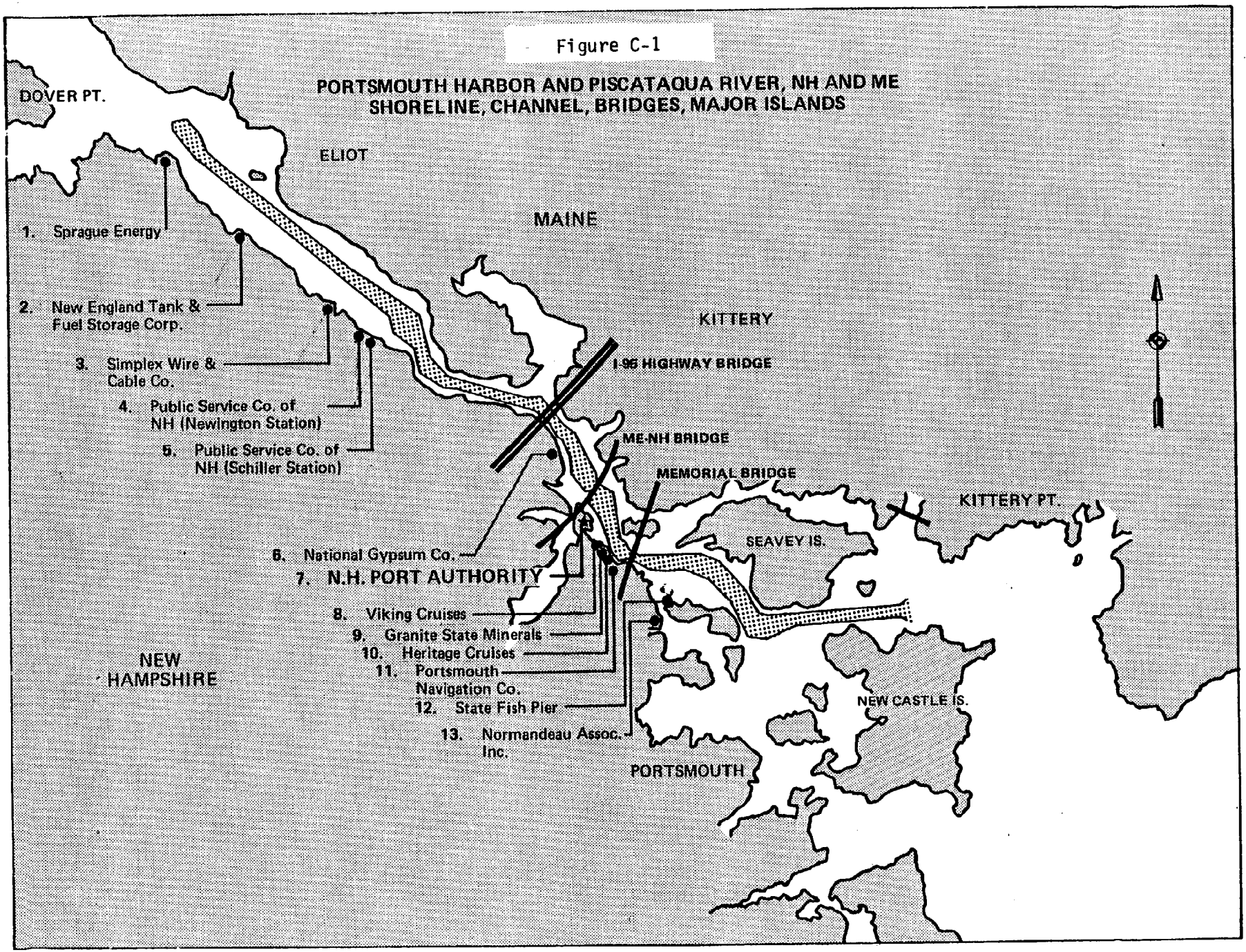
General Cargo

The New Hampshire State Port Authority wharf is the principal general cargo terminal in the Port of Portsmouth,[1] handling scrap metal, lumber, containers, and miscellaneous general cargoes. The terminal is operated by John T. Clarke and Son Stevedores under a 20-year lease with the New Hampshire State Port Authority. Mobile cranes and forklift trucks for loading/discharging cargoes are available. There are two transit sheds with a total of 50,000 square feet of covered space, and approximately 10 acres of open storage space. The terminal is served by rail (Boston & Maine) and has excellent highway connections to I-95.

At present, the terminal is served on a weekly basis by the Yankee Clipper, a small container vessel chartered by Hapag-Lloyd. Hapag-Lloyd uses this vessel to feed New England container cargoes to/from its Canadian-Transatlantic linehaul vessels at Halifax. Traffic averages approximately a three to one

[1]General cargo has occasionally been handled at the Granite State Minerals Company terminal.

Figure C-1


PORTSMOUTH HARBOR AND PISCATAQUA RIVER, NH AND ME
SHORELINE, CHANNEL, BRIDGES, MAJOR ISLANDS
DOVER PT.
ELIOT
MAINE
1. Sprague Energy
2. New England Tank & Fuel Storage Corp.
3. Simplex Wire & Cable Co.
4. Public Service Co. of NH (Newington Station)
5. Public Service Co. of NH (Schiller Station)
KITTERY
I-95 HIGHWAY BRIDGE
ME-NH BRIDGE
MEMORIAL BRIDGE
KITTERY PT.
SEAVEY IS.
6. National Gypsum Co.
7. N.H. PORT AUTHORITY
8. Viking Cruises
9. Granite State Minerals
10. Heritage Cruises
11. Portsmouth Navigation Co.
12. State Fish Pier
13. Normandeau Assoc. Inc.
NEW HAMPSHIRE
NEW CASTLE IS.
PORTSMOUTH

ratio of imports to exports. Other vessel calls are unscheduled. Scrap shipments average approximately 20,000 to 25,000 tons per vessel, with approximately 150,000 tons a year shipped. Scrap vessels are loaded in seven to ten days, working eight to ten hours a day.

The potential for increasing traffic in cargoes other than scrap metal or containers shipped or received on the Yankee Clipper could be constrained by berth availability and storage area. The potential for delay in vessel berthing constrains the ability to attract additional scheduled services (assuming that cargo levels adequate to justify the service could be attained), since there is only one berth at the terminal. Berth occupancy levels for single-berth, general cargo terminals typically cannot exceed 40 to 50 percent without causing occasional vessel delays sufficient to deter potential service. Berth occupancy levels for multi-berth general cargo terminals on the other hand can typically average 60 to 75 percent, depending on the number of berths, without causing excessive vessel delays. An analysis of berth utilization rates performed by the Port Authority for the period 1978-1983 shows berth utilization at the Port Authority pier to have averaged 49.5 percent during the period 1980-1983. In all but one of these years the utilization rate exceeded 50 percent.

Storage areas available at the terminal are comparable to most single-berth general cargo terminals handling a mix of containers, breakbulk, and neo-bulk (scrap metal and lumber) cargoes. Dwell times for the scrap metal could, however, create a conflict if additional containerized cargo could be attracted. Based on data compiled by the U.S. Maritime Administration (MarAd), throughput for a mixed use general cargo terminal averages approximately 30,000 tons per acre, yielding a potential storage capacity of approximately 300,000 tons per year for the Port Authority terminal. However, the infrequency of scrap metal shipments increases the dwell time on terminal and could potentially create storage constraints if additional containerized cargoes were handled.

Within the context of recent scrap and container volumes, it appears that increased shipments of scrap metal or containers could be accommodated without conflicts in berth use but could be constrained by land availability associated with the long dwell times of the scrap metal. Attraction of additional scheduled service, however, could be constrained by berth availability as well as storage availability. Using the methodology for estimating marine cargo terminal capacity developed by MarAd[2] and the

[2]Port Handbook for Estimating Marine Terminal Cargo Handling Capability, 1979.

current cargo mix and operational parameters, the efficient annual capacity of the Port Authority terminal is estimated to be approximately 180,000 to 200,000 tons.

Port Financial

The Port Authority incurred losses for fiscal years 1979-1982 (see Figure C-2). A restructuring of John T. Clark's terminal lease arrangement, an increase in mooring revenues, and a reduction in debt service obligations resulted in profitability in fiscal years 1983 and 1984.

Revenues

Gross Revenues

Gross revenues generated by activity at the State Pier are generated by a variety of sources. A breakdown of these sources together with the gross revenues generated are as follows:

Terminal Operations (dockage, wharfage, stevedoring)	$1,536,000
Vessel Expenditures	369,000
Crew Expenditures	16,650
Pilot Fees	21,400
Tugboat Fees	45,000
Viking Income	280,000
	$2,268,050

Port Authority--From FY1979 to FY1982 the terminal lease arrangement between John T. Clark and the Port Authority provided the Port Authority with a minimum of $100,000 per year from terminal operations. Effective FY1983, the minimum was increased to $150,000 per year with the Port Authority entitled to 80 percent of all dockage and wharfage accrued over the $150,000 base.

Moorings--Revenue due to Moorings increased dramatically from FY1982 to FY1983. The increase resulted from escalation in mooring fees.

Expenses

Payment in Lieu of Taxes--The Port Authority currently pays the city of Portsmouth $30,000 per annum in lieu of property tax.

Operating Budget--The operating budget has not increased significantly between FY1980 and FY1984. The increase from FY1979 to FY1980 was attributable to the absorption of consultant's position by special grants and not the operating budget.

Debt Service--The Port Authority debt service burden has declined steadily since FY1979, reflecting continued amortization of the outstanding principal. Debt service expenses are for pier expansion and for the original construction and expansion of the pier and transit shed.

Economic Impact

Dry Bulk Commodities

The Granite State Mineral Company and National Gypsum Company wharves handle dry bulk salt and gypsum, respectively. Granite State uses mobile cranes for unloading vessels while National Gypsum relies on self-unloading vessels. Granite State appears somewhat constrained by land availability at the terminal; National Gypsum could resolve any potential constraint on available land through vessel and production scheduling. Using the MarAd methodology for estimating terminal capacities, annual capacity for dry bulk commodities in the Port of Portsmouth is estimated at approximately 750,000 tons. In 1983, 364,000 tons of salt and gypsum were handled in the Portsmouth Port region.

Petroleum Products

Five terminals, serving multiple users, handle petroleum products in the Port of Portsmouth. This includes partial use of the National Gypsum terminal by Northeast Petroleum. Capacity of these terminals is constrained by channel limitations, since vessel size is limited to the 40,000 to 45,000 DWT class. Based on this factor, the MarAd methodology, and assuming 30 percent dedication of the National Gypsum terminal to petroleum handling, annual capacity of the port for handling petroleum and petroleum products is estimated to be 6.8 million tons. In 1983, approximately 1.5 million tons of liquid bulk cargoes were handled in the Portsmouth Port Region.

3. Economic Profile of Port of Portsmouth and Piscataqua River

For the purposes of this report, alternative activities will be separated into two activity types, water-dependent and water-enhanced. Recreational boating, commercial fishing, tourboat

activity, and partyboat activity are water-dependent since without a water resource, such as a river or ocean, they would not exist. Water-enhanced activities are those whose operations significantly benefit from a water resource, but whose existence is not contingent on a direct relation with the water resource. Examples of water-enhanced activities are the tourist industry and the general residential, retail, commercial activity along the waterfront. The following discussion describes each of the activities along the Piscataqua River from Newcastle to Newington and provide order of magnitude estimates of the economic return from each activity.

The survey findings were collated from interviews along the waterfront, existing reports, files from past planning studies, and classical studies of each activity. The estimates contained herein are preliminary.

Industrial Activity

Six major industrial users are located along the Piscataqua River. These six are John T. Clark/Port Authority, Granite State Minerals, National Gypsum, Portsmouth Navigation, Public Service Company of New Hampshire, Simplex Wire and Cable, and C. H. Sprague. In total, these firms employ an estimated 770 employees in these operations, excluding ancillery employment of truckers and outside vendors.

The economic return to the State and local communities from these industrial activities includes business profits taxes, property taxes and the expenditures of these companies and their employees on goods and services in the State and local economies. Given the proprietary nature of these firms revenues and wage data, no attempt has been made to quantify the gross economic impact of these organizations on the local economy. However, a review of property taxes paid to local municipalities during 1984 showed that collectively, these organizations paid an estimated $910,000.

The majority of the finfishing effort takes place in combination lobster/gillnet boats, represented by at least 25 ft. to 40 ft. vessels. There are approximately 72 vessels of this size on the New Hampshire side of the Piscataqua River. There are also around 42 vessels over 40 ft. in length representing larger lobster vessels and finfish draggers in the river area. Approximately 85 percent of the finfish and 40 percent of the lobsters landed in the state comes into the Port of Portsmouth. There are approximately 150 fishermen, 100-120 crew members and 120 lobstermen, fishing out of the New Hampshire side of the river full-time (approximately). This number is difficult to determine because there are many part-time fishermen working at only certain times of the year, working other jobs as well as fishing.

The lobstering in the river has been the mainstay of the New Hampshire fisheries with lobsters coming mainly from the Isle of Shoals area and from shallow offshore ledges (4). Most lobstering is conducted by full-time lobstermen with 300 licensed lobster boats in the state waters. (See Exhibit C-3.) There are a half dozen lobster boats in the Piscataqua River that utilize the State Pier, but the majority of vessels land their catch at private docks or at takeout locations connected with retail/wholesale outlets all over the river. Most lobsters taken from the offshore areas are shipped out to outerlying market areas, as are the finfish. A large volume of lobster is sold and used at local seafood restaurants on both the Maine and New Hampshire sides of the river. There is no lobster co-op in the area, but some of the overall landings of the state come out of the State Pier and are handled by the Co-op. The majority of the finfish landings from the coastline come across the State Pier at Portsmouth.

The State Pier is a multiple use facility at the northern edge of Pierce Island, adjacent to downtown Portsmouth. The pier was constructed in 1977 from a combination of the State of New Hampshire's Department of Regional Economic Development (DRED) and federal monies for $1.5 million. (5) This facility is equipped with a ten ton per day ice-making facility, a fixed dock with provisions for 25 vessels from 25 ft to over 40 ft. on the southern pier face. Five to six vessels tie up alongside the fixed pier and 20 vessels tie up in wooden slips on the northern pier face. The State Pier is run by DRED with a state manager on site to oversee daily operations. The fishing vessels that reside at the pier belong to the Portsmouth Co-op, a private fish cooperative run by a private manager. There are approximately 21 co-op members with the co-op unloading 30 vessels on the river. This past year the State issue of a bond to provide for a

$150,000 low interest loan to the Co-op that added a cold storage room, a 5 ton ice machine, a loading bay and some offices. Though there has been no substantial increase in the numbers of Co-op members, landings have increased from 3.8 to 5.3 million lbs. over the past year.

The accompanying exhibits (C-5 and C-6) present the economic impact of commercial fishing activity in the Port of Portsmouth. Out of a total state finfish landing figure, Portsmouth represented 8.2 million pounds and $3 million in value for 1984. Lobsters coming into the Port of Portsmouth were 227 thousand pounds and $683,000 in value. The total return from ex-vessel landings in the port, therefore, is $3.68 million. The total market value for Port of Portsmouth species is $12.9 million $0.83 of which remains in New Hampshire. The estimated return from secondary expenditures for goods and services by Portsmouth Harbor fishermen is $1.98 million annually, $846,200 of which stays in New Hampshire. The total direct return to the port, therefore from commercial fishing, is $4.5 million a year, a significant amount.

Recreational Boating

Though New Hampshire has only 18 miles of coastline, the coastal area has become the focus for an active water-based recreation area for southern New Hampshire, southern Maine and northern Massachusetts residents. Easy access from coastal routes and interstate 95 and north/south access to Concord, Lake Winnepesaukee and the mountains has made beaches, boating, and general scenic enjoyment resources available to well over 230,000 visitors (1980) per season. Seasonal populations in the New Hampshire coastal area as much as double and triple during the summer months as a result of these uses (12).

Coastal New Hampshire and, in particular, the mouth of the Piscataqua River, is a central location in the major recreational ocean-going passageway between southern and northern New England (passage "downeast") for great numbers of pleasure boats. Many local residents have their boats moored in the coastal areas for day trips, recreational fishing and cruising along the coastline. Approximately 70 percent of the recreational boating activity, based on numbers of moorings (750 out of 1,099 total for the state), takes place in the Portsmouth Harbor-Kittery Harbor area. This is solely as a result of the amount of coastline and mooring slip facilities available in this area.

Both Rye and the Hampton/Seabrook areas are popular recreational boating areas. Because of the strong current and tidal conditions of the Piscataqua River, restricted access because of bridge conditions and general lack of public facilities, the balance of the river's boating activity takes place at the mouth of the river in either backchannel in Newcastle or in Pepperill Cove in Kittery.

Overall boating registrations in the New Hampshire area doubled from 1972 to 1981 with an increase in registrations of at least eight percent per year from 1977 to 1981 (9) with registrations in New Hampshire increasing as much as 100 percent since 1981 in the state. These statistics reflect mostly the growth at Lake Winnepesauke, ostensibly, increased registration of the lake would have no effect on the seacoast regions. With the numbers of registrants however, the lake cannot handle increased facilities that demand for facilities will be evidenced in the seacoast region--particularly, Portsmouth. Mooring facilities in the state increased from 200-300 moorings in the 1966/1967 period to 800-1000; this represents a 200-300 percent increase.(9) Total moorings in the state have only increased to a total of 1,099 since 1981 because of the lack of available space for additional moorings. Most of this increase has come from a reorganization of existing mooring areas (e.g., backchannel).

The waiting lists for additional slips and moorings in the Portsmouth/Piscataqua River and Kittery, Maine areas longstanding and significantly large at 142 and 200 respectively (9). Because additional facilities are not being provided for to meet this demand (at least to a significant degree) the waiting lists have remained relatively static. In a detailed examination of working lists for all possible mooring areas in the Portsmouth, and Newcastle areas we counted as many as 378 footers waiting for moorings (38). The overall waiting list between the State of New Hampshire coastline is 545 boaters (38). Many of these boaters have applied for multiple mooring locations in frustration for getting any location at all for years. Boaters must stay on the list for four to six years to get a mooring (38).

The following figures illustrate the numbers of boats and boating facilities included in recreational boating activity in the Portsmouth Harbor/Piscataqua River area. The computation of these tables was done in an effort to present recent statistics on activity levels and to assign a value to recreational boating in the river area.

Exhibits C-7 and C-8 present overall recreational boating numbers for the river area as a whole. The numbers are presented in an effort to quantify activities and support facilities within the river system. Statistics have been compiled on the basis of personal observation, site visits, other recreational boating studies, and from Port Authority and Harbormaster statistics. Where numbers are as yet unresolved or there exists a discrepancy between source figures, a range or several figures are presented. The major source of published data was the 1985 Boating Almanac (8) for Massachusetts, Maine, New Hampshire, and Rhode Island. Other studies and publications from state and local sources were utilized to reconcile historical figures. Since the study was undertaken after the boating season (October 1985), in-water boat counts, sizes, and activities are best judgments applied from Port Authority and Harbor master knowledge of the River area.

Exhibit C-7 shows a wide variety of public facilities. The 750 moorings in the river are listed as public/private for the simple fact that mooring tackle is most often owned by private boaters, and a fee of $2/ lineal footer length overall is charged per foot of boat length by the Port Authority. The number of moorings in the Picataqua River has increased by about 100 since the A.D.L. survey by the placement of 75 (approx.) moorings in the backchannel area with a mooring realignment and the placement of 25 or so moorings off Pierce and Goat Islands. There are only six guest moorings in the river area and twenty five guest slips at public facilities with provisions for other great moorings, being made through the habormaster with vacated private moorings. Private facility slips come available only at times when present slip reenters leave on a cruise. Dock space is at a premium with only 1300 sq. ft. of public dock space available for tie-up (excluding State Fish Pier). There are ten boat ramps within the river system. Most are in original, unimproved condition, but heavily used despite this fact. There are public facilities with a landing and rest room areas. No public facilities are provided with shower, laundry, and clubhouse facilities in the river. A few private places provide these facilities, but not to a degree that would significantly attract transient recreational boating.

Exhibit C-8 shows private facilities available. Dock space and slips are at a premium because of the overall lack of area to expand and lack of additional sites. With only four transient designated slip spaces and thirteen guest moorings available on the New Hampshire side, transient boating is not widely promoted. Private moorings owned by marinas are few, without being owned and maintained by individual boaters. Storage area is also at a premium with only 650 of the 1,300 boats on the Piscataqua system being stored at Maine facilities. The balance of boats are

hauled to private boat owners' yards. There is ample capacity and facilities for boat repair, gear supply, gasoline, and boat sales with much activity on both sides of the river centered at backchannel/Sagamore Creek; Pepperell Cove; Kittery; and Eliot with no major facilities in the Portsmouth area proper. There are two yacht clubs with approximately 350 members.

Exhibit C-9 presents the overall economic impact from recreational boating activities along the river. Total primary expenditure on the river amounts to $3.1 to $3.2 million annually, with returns to the New Hampshire side amounting to $1.6 to $1.7 million annually. This figure is a significant return for a recreational activity.

Tourboat Activity

Like commercial fishing and recreational boating, tourboat activity is a water-dependent activity utilizing the Piscataqua River and Portsmouth waterfront as a base for operations. Currently, two tourboat services are using Portsmouth as a staging facility for cruising in the Piscataqua River. The Viking of Yarmouth, Inc. (Viking Cruises) provides inland cruises along the Piscataqua River Basin, short ocean cruises to the Isles of Shoals off the coast, and feeder services to the Shoals Marine Laboratory (for 19 seasons) and Star Island conference facilities (for 23 seasons) which are also on the Isles of Shoals. The tourist cruises include regular daily departures to designated sites in and outside harbor, and specialty events such as band entertainment, dinner cruises, and whale watches. Tickets prices range from $4.00 to $20.00 dollars depending on the type and time of cruise, with $ 15.00 being the median adult ticket price. The Viking contract with the marine lab involves the delivery of supplies and scientific equipment. The feeder service to the conference center on Star Island serves an average of 240 guests each week, all of whom must use the Viking transportation if they do not have access to a private water transportation. Food supplies, equipment, and employees (about 100 staff for the summer months) must all be transported via the Viking feeder service as well (16).

Viking of Yarmouth's operating season for tourist cruises and for the feeder service runs from early spring to late fall. During the 1985 summer season, approximately 65,000 people (total attendance based on all Viking services offered) embarked on either the 500 passenger "Viking Sun" or the leased sister ship, a vessel having half the capacity as the "Viking Sun". Both vessels have a number of deck levels housing an air-conditioned/heated observation area, an alcohol bar, a snack bar, a lounge, and a fully-equipped kitchen.

Viking of Yarmouth leases 1.2 acres (Barker Wharf area) from the State of New Hampshire, which allows the state to accommodate additional space requirements of the Port Authority on relatively short notice. Viking's land provides a parking lot for approximately 80 cars, a small office building, a ticket booth, and a rest area for waiting passengers. The pier staging facility has deteriorated over the years due to fire in the 1960s and poor upkeep. The pier now stands about 55 feet from the existing shore line.

A second tourboat service, Portsmouth Harbor Cruises, offers cruises similar to the Viking's but specializes in the Inner Harbor and river estuaries where the larger Viking ships cannot go. The 49 passenger "Heritage" embarks roughly five times daily from June to October on short narrated and unnarrated cruises. Last season it carried nearly 17,000 passengers on excursion cruises throughout Portsmouth Harbor. In addition, the "Heritage" is available for private party chartering.

Portsmouth Harbor Cruises currently rents dock space and a ticket area adjacent to Portsmouth Navigation Company from the Oar House restaurant on Ceres Street. Parking facilities for cruise passengers is limited to whatever space can be found in the neighboring streets or the private parking garage.

Total economic return from both tourboat operations is $2,782,600, a significant primary return to the Portsmouth community in the form of gross revenues from operations and direct expenditures of passengers. Exhibit C-10 provides a breakdown of the primary return. The tour boat industry in Portsmouth employs some 53 people seasonally during the summer months and two full-time employees year-round.

Party Boat and Charter Boat Activity

Partyboat activity in many New England ports is an important business as it attracts large groups of recreational fishermen. A partyboat is a sport fishing boat open to all fishermen who are charged a flat rate per person. Boat sizes range from 20 to 80 passenger boats, operate approximately 92 fishing days and carry an average of 26 passengers per trip (approximately a 50 percent conservative capacity rate).(18)

A charter boat is a sportfishing boat hired for a fishing trip by a group of six or fewer people. A typical full-time charterboat will make the equivalent of 65 all-day fishing trips a season and charge from $250 to $450 per trip for half-day, all-day, or offshore trips which would return approximately

$26,000 in charter fares.(19) Secondary expenditures to bait/tackle shops, retail, grocery and food/drink establishments could amount to $3,900 for a community having one full-time charterboat using the harbor. Portsmouth Harbor has two or three fishing boats that act as part-time charterboats to defray their normal operating costs. As these services are not regularly available to the public, total economic return to Portsmouth is impossible to determine.

Other Ship Attractions

The Portsmouth Harbor hosts other water-dependent activities: the visiting ships, the culmination of the Sail Training Race, the Prescott Park "gundalow," and sailboat charters. The scheduling of visiting Tall Ships and British and U.S. frigates is coordinated through the Chamber of Commerce, and any collected revenues are managed by the Chamber as well. Specific ships do not make guaranteed annual visits; however, records show that each year two or more ships visit. The average visiting ship attendance is 18,700 people each year based on Chamber of Commerce statistics. This annual attendance contributes approximately $280,005 in primary return (direct expenditure) to the local economy. No attempts were made to assess the ship's expenditures for fuel, water, repairs, food and other provisions.

The Sail Training Race is a regularly scheduled event, providing a relatively small return compared with other water-dependent activities. Each year about 3,000 spectators visit Portsmouth for two days, and although no admittance fee is involved, the return for direct expenditures is $50,000 to the local economy.

Another ship attraction is the "Captain Edward H. Adams," a 69-foot replica of the original gundalow sailing vessel. The ship is managed by a non-profit, educational organization, and is moored at Prescott Park, when not visiting nearby ports. In general, attendance figures are not available, but numbers would coincide with the Prescott Park traffic.

Over the last year, a sailboat charter, the "Lucy Lee," has taken passengers on day and week trips along the New England seacoast. The operation is temporarily based out of Prescott Park. No economic returns were computed.

The total economic return to the local economy from Other Water-Dependant Activities is approximately $330,005 per year.

Tourism

The tourist industry in the State of New Hampshire plays an active part in the state's economy in the mountain, lakes and coastal areas. As many as 1,000,000 visitors travel to the state each year, with approximately 350,000 of these coming to the seacoast region of the state alone.(12)

According to one federal publication (1980), tourism/recreation provides $634 million in gross receipts for retail, sports oriented, lodging, transportation , site attractions, and food and drink in the state of New Hampshire or 10.7% of the gross product. Without tourism/recreation, New Hampshire's economy would drop $254 for every man, woman and child in the state. Employment generated from tourism industries accounts for 41,650 of the 390,050 total state employment (11% of the total). The total payroll for tourism related employment is $208 million (23).

While the tourist industry is not directly dependent on any particular water resource, such as a large river or ocean, tourist activities are still enhanced by the presence of these water resources. The present location of water-enhanced tourist attractions, such as the Strawberry Banke settlement, are important factors in the present economic make-up of the river. For this reason, our study team felt that establishing an economic return for Portsmouth tourism was necessary to further define the complete impact the river activities have on the regional economy. Tourism statistics are very hard to come by in that there has been no consolidated effort to quantify tourism statistics in recent years. We have collected data to the best of our abilities from current available sources of the State Office of Vacation Travel, industry professionals, and older reports from the late 1970s.

City officials, public interest groups, and the state tourist councils have been very aggressive in preserving the historic sites and traditional seaport activities on the Piscataqua. The visitor atmosphere in Portsmouth differs from other seaport areas such as Provincetown and Nantucket, Massachusetts whose economies once relied on waterfront commerce and trade. These towns now rely entirely on revenues generated from the tourist industry. Portsmouth Harbor, on the other hand, is still an active port, accommodating oil tankers, cargo ships, lobster vessels and pleasure boats; and still draws large revenues from its industrial source of deepwater river activity.(34)

The most precise records of attendance and economic returns are kept by the individual attractions having full-time

directors, as it is in their functional interest to track the success or failure of a particular season. For the purposes of this study, the study team limited our analysis to these visitor attractions in Portsmouth and separated them into two major categories in order to keep gross revenues and payroll figures confidential: Museum/Theater and Festival/Fair. Museum/Theater attractions charge an entrance fee, while Festival/Fair attractions do not.

Museum/Theater Tourist Attractions

Strawberry Banke. One of the most prominent Museum/Theater attractions is the Strawberry Banke settlement located on the waterfront behind Prescott Park. This $2.5 million renovation of a 10-acre museum neighborhood includes 35 historic homes,plus gardens, period piece exhibits and a gift shop. By the end of the current season, nearly 53,000 people will have visited the museum, which is open year round. This attendance figure includes 6,000 arriving in adult bus groups, 10,000 in children's bus groups, and 44,000 individuals. Strawberry Banke employs about 15 seasonal staff at an hourly rate, and 28 full-time employees on either salary or hourly wages.

Theater by the Sea. A second Museum/Theater attraction is the Theater by the Sea. This 263-seat theater performs eight plays per season. The facility is located in an old brewery on the waterfront which is now renovated to include the theater, a pre-theater bar and an 11 room inn. Last season the theater sold 4,900 subscriptions for its annual season in addition to individual ticket sales to each show costing approximately $16.00 each. On average, the theater operates between 70 and 80 percent capacity. People employed by Theater by the Sea include about five full-time operating staff and up to 50 part-time acting, production and operating crews.

Children's Museum. A third Museum/Theater attraction is the Children's Museum located next to Strawberry Banke. The museum, which opened in 1983 after renovations to the South Meeting House were completed, acts as an educational resource and exploration ground for visiting children. During the museum's 1984-1985 season, 25,000 children visited the museum which includes membership and individual attendance. The museum employs five full-time staff and about three part-time staff on hourly wages.

Historic Walking Tours. A fourth Museum/Theater attraction surveyed is the historic walking tour of the waterfront and sections of old town. The self-guided tour takes visitors on a 2.3 mile walk and is free, except for optional entrance into six

historic home which costs $6.00. The Chamber of Commerce estimates that as many as 1,000 visitors purchase the $6.00 ticket, but does not have accurate means of determining the number of ticket sales for individual house visits.

Portsmouth Music Hall. A fifth attraction which recently opened is the Portsmouth Music Hall. The Hall seats 900 people per performance. In 1985 the Hall performed 125 concerts and 16 musicals running 8 performances each. According to the director, attendance has averaged 40 percent to 50 percent capacity thus far. The Hall employs three full-time administrators and any number of musicians, actors/actresses, and production crew.

These Museum/Theater attractions provide significant economic returns to Portsmouth, even though most attractions must rely on fund drives and private donations/sponsorship to survive. The total economic return from entrance fees and direct expenditures of the water-enhanced Museum/Theater attractions is $2,726,913 a year as shown in Exhibit C-10.

Festival/Fair Tourist Attractions

The second category within "water-enhanced" tourist attractions is Festival/Fair. As no admissions charges pertain, all returns represent direct expenditures in the community.

Market Square Day Fair. By far the largest event within this category is Market Square Day Festival which brings roughly 75,000 visitors over a seven-day period to the downtown Portsmouth area for shopping, parades, road races, and international food specials. The event generates considerable sales revenues for local businesses and restaurants.

Bow Street Fair. A second festival, the Bow Street (formerly Ceres Street) Festival brings 20,000 visitors to the waterfront in July for craft shows and special events. All revenues from the Bow Street Fair are generated from unrecorded sales of goods. Revenues less fair expenses are distributed to Theater by the Sea as contributions to its operating budget.

Prescott Park Arts Festival. The Prescott Park Art Festival is a third Festival/Fair attraction. The festival runs for six weeks in the summertime and includes musicals, concerts, art classes and an art's show. Attendance records kept from each event indicate that 50,000 visitors participated in the festival this summer. During the regular season, the festival employs 20 full-time salaried staff and from 10-50 part-time performers and production assistants. Nearly half of these part-time performers

are unpaid volunteers from the community. Festival events and festival staff are also supported by 200 local businesses who provide staff and monetary assistance throughout the year. Funds are also raised for the festival by an annual fund drive and by raffles.

The total economic return from all water-enhanced Festival Fair activity (Market Square Day, Bow Street, Prescott Park Arts Festival) is $1,331,750.

Tour Bus Groups. A new tourism activity managed and promoted by the Seacoast Council on Tourism is the solicitation of touring bus groups to the Portsmouth area. Each bus group pays a flat per person rate for package tours of the Portsmouth sites. The rate varies from $18.00 to $50.00, depending on the type of package. During the 1985 summer season, 14 bus groups were attracted to Portsmouth for the first time. Seacoast Council calculates that $37,000 is returned to the community from total bus group revenue.

All types of water-dependent and water-enhanced activities amount to an economic return of $7.2 million to the Portsmouth economy (Exhibit C-10).

3. Socioeconomic Profile

The towns and communities of the Piscataqua River area are located in a region which is experiencing rapid growth changes in areas such as population, housing, commercial/industrial activity, and the retail and service sectors of the economy. Most of this growth has had a positive impact on the area in terms of jobs, shopping activity and housing. However, such growth has also had the negative impact of undue pressure on already loaded public facilities, traffic circulation, parking, water and sewer systems, and recreational facilities.

In terms of a socioeconomic profile, the Piscataqua River area is part of Rockingham County, which is part of the seacoast region of New Hampshire. The area, county, region, and state are described below in terms of population, employment, unemployment, housing, tax base, and industrial/commercial development.

The towns of Portsmouth, Newington and Newcastle that comprise Rockingham County occupy 25.7 square miles with Portsmouth the largest at 16.4 square miles and New Castle the smallest at 0.8 square miles. As Table C-1 shows, the number of housing units in the three towns totals 10,678 with 10,059 of these in Portsmouth.

Table C-1

MUNICIPAL DATA

Town	1980 Median Income	Land Area Square Miles	Housing Units
New Castle	22,022	0.8	360
Newington	16,357	8.5	259
Portsmouth	14,426	16.4	10,059
Total	14,730	25.7	10,678

Source: Business and Industry Association of New Hampshire: Economic Profile--Seacost Region, October 18, 1985.

Population

The population of Portsmouth and its region has grown almost continuously during the twentieth century with the greatest increases during and following the two world wars. Exhibit C-11 shows a slight decrease in Portsmouth's population during the 1960s while both the county and state experienced gains in. A return to growth occurred in Portsmouth in the 1970s and that trend has continued in the 1980s. Population projections for Portsmouth and Rockingham County for 1990 show an expected rise of 16.4 percent over the 1980 base population. This continuous growth has been attributed to a number of causes including the proximity to the Boston metropolitan region, accessible transportation, quality of life characteristics, tax benefits, and diversification of employment opportunities.

Local patterns of population growth in the three towns are shown in Exhibit C-12 for the period from 1960 to 1983. The last three years of growth show an 8.9 percent increase for the City of Portsmouth, a slight decline for New Castle, and a slight increase for Newington. Rockingham County in total experienced growth of 6.7 percent from 1980 to 1983 while the state experienced only 4.2 percent.

Employment

Commuting patterns of Portsmouth area residents provide a linkage from population statistics to employment data. Exhibit C-13 shows patterns reported in the 1980 census. While only one quarter of New Castle and Newington residents worked in their resident towns, 61 percent of Portsmouth residents worked in Portsmouth.

The Rockingham County economy is broadly based on manufacturing, business and personal services, and tourism. The types of employment by industry group in Rockingham County are shown in Exhibit C-14. Manufacturing employs 24.0 percent, of which two thirds or 16.5 percent are for durable goods--primarily machinery, fabricated metal products, and electrical products. Nonmanufacturing employment is principally composed of trade at 35.9 percent and services at 21.6 percent. Half of the trade employment consists of retail-food and retail-eating and drinking establishments. Amusements, insurance, hotels, medical, and business services provide 60 percent of the non-trade jobs.

Unemployment

New Hampshire unemployment declined in October 1985 to a six-year low of 2.6 percent. In the Portsmouth employment area, 2,700 people were unemployed in October also at a rate of 2.6 percent. These levels have consistently been below national averages. Table C-2 shows the city rates compared to county, state, and national rates for 1983, 1984, and October 1985.

Table C-2

UNEMPLOYMENT RATES[1]

	Portsmouth	Rockingham County	New Hampshire	United States
October 1985	2.6%	N/A	2.6%	6.8%
Average 1984	5.3	6.0	4.2	7.5
Average 1983	3.7	5.7	5.4	9.6

[1]Source: State of New Hampshire, Division of Employment Security. Not seasonally adjusted.

Housing

Since 1970, Portsmouth has had a number of periods of rapid residential expansion. Beginning this period with 8,275 housing units, the number has grown an average of 137 units per year to 10,059 units in 1983. The growth has been higher than average in the most recent years, as shown in Exhibit C-15. The number of building permits for residences has averaged 264 per year during the period from 1981 to 1984 and totaled 335 in 1985. Since 1970, the type of new housing has shifted from single family dwellings to condominium owned multiple family structures. However, the number of multiple family dwellings amounts to only 30.1 percent of total dwellings in Portsmouth in the current fiscal year as shown in Exhibit C-16.

Tax Base

The tax rate computation as well as the sources and uses of funds for the City of Portsmouth are shown in Exhibit C-17 for fiscal years 1983 to 1986. A reevaluation occurred in 1984 that doubled the property values and reduced the tax rate to half. Property taxes are the principal source of income to pay for Portsmouth's public services. They represented 71.1 percent of the required revenue in 1986.

Industrial/Commercial Base

Since the 1960s there has been significant diversification of the economy in the seacoast region because of the threatened shutdown of the Portsmouth Navy Base, the largest employer in the region (9,000 employees). This growth has been in non-defense, industrial and commercial industries with a revitalization of downtown Portsmouth, other significant efforts in Dover, Rochester, Somersworth, Exeter, Newmarket, and Durham. Because of the absence of personal and general sales taxes, many industries and commercial concerns have located in the Portsmouth area. Employment rates are lower than state and national averages. Significant contributors to the economy include Pease Air Force Base, University of New Hampshire, and the New Hampshire Vocational/Technical College in the seacoast area.

The region has experienced significant expansion and diversification in manufacturing, in primary and secondary metals and machinery in the durables, and in rubber and plastics which have to offset previous decreases in dominant shoe and textile industries. Electrical industries, apparel, paper and allied products lend diversity to the regional economy. The city has three

commercial industrial parks with much available developable land. Five major companies have located in these parks since 1977 and Liberty Mutual and Data General have expanded considerably.

Examples of selected new industries are shown in Exhibit C-18. The major employers are shown in Exhibit C-19, and the largest taxpayers are listed in Exhibit C-20. Most recently, the following large projects have been approved, are under construction, or have recently opened:

- Sixty-store outlet mall--employing 150; $9,000,000 valuation; opened--December 1984.
- Downtown hotel, condominium and office project--employing 250; $20,200,000 valuation; completion date--summer 1987.
- Private hospital--$23,000,000 valuation; completion date--July 1986.
- Downtown office building renovation--$4,000,000 valuation; opened June 1985.
- Waterfront condominium and commercial office project--$17,000,000 valuation; completion date--summer 1986.
- Several condominium projects--$5,000,000 valuation; completion date--spring 1986.

Because of this influx of commercial/industrial activity and revitalization of downtown areas, there has been a significant growth in tourism (discussed separately), in retail activity, office uses, restaurants, and housing in areas such as downtown Portsmouth.

4. Current Trends in Shipping Activity

The assessment of future prospects for a port or terminal must extend beyond the boundaries of the immediate port area and examine the shipping system of which the port is merely a part. This section provides a brief overview of recent developments and potential future developments in the liner industry which have or will have an impact on future container traffic through the Port of Portsmouth.

The discussion focuses on the U.S. regulatory environment within which ocean carriers must operate and on the ocean shipping arena in which these carriers participate. Implications for the Portsmouth Port Region are then reviewed.

a. The U.S. Regulatory Environment

Historically, ocean carriers provided port-to-port services, i.e., the loading and discharging and transportation of cargo between ports. Shippers were responsible for securing and arranging their own inland transportation.

Federal Maritime Commission regulations require port-to-port rates to be equalized across specified port ranges in order not to discriminate against ports. With equalized port-to-port rates shippers historically chose to route their cargoes through the closest port in order to minimize their inland transportation costs since those costs was a function of distance. This practice created captive markets for local ports.

Deregulation of the U.S. transportation industry has dramatically altered rate structures and cargo routing. The Shipping Act of 1984 provides the legal framework for the establishment of door-to-door rates by ocean carriers, i.e., the provision of inland and ocean transportation services by a single carrier under a single bill of lading and freight rate. While port-to-port rates and the ocean portion of intermodal rates remain equal for a given geographic region, inland transportation services and costs have changed dramatically due to a number of factors including:

- Deregulation of road and rail carriers through the Motor Carrier and Staggers Acts, respectively, has resulted in much wider latitude in rate setting for inland freight movements.
- Capitalizing on the effects of deregulation, ocean carriers have negotiated service contracts with trucking companies and railroads and in some instances have established dedicated trucking companies.
- Ocean carriers and conferences have established door-to-door rates serving most regions of the U.S.

As a result of increased latitude in rate-setting authority, ocean carriers have asserted increasing control of the routing of cargo on both the ocean and inland legs.

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Today, ocean carrier's route cargoes in order to achieve economies of scale in both ocean and inland transportation. This selective routing process has led to the bypassing of local ports as economies of scale offset the increased costs of inland transportation associated with longer inland distances, e.g., major Transatlantic carriers can provide door-to-door service to New Hampshire shippers via New York or Montreal for the same or lower cost than a shipper can obtain using Portsmouth.

The net result of deregulation and the ensuing response by ocean carriers has been:

- Shippers face improved transit times for the same or lower cost on a "port blind" basis and can obtain door-to-door transportation with a single telephone call.
- Local ports are often bypassed since the shortest overland route does not necessarily equate to the lowest transportation cost to the shipper

Rates

To illustrate the competitive position of Portsmouth in view of door-to-door intermodal services currently being offered through other regional ports, TBS examined rates being offered to shippers for selected origins, destinations, and commodities. Table A-1 contains representative import and two export commodities with similar origins and destinations.

The data show container routings via Portsmouth and Hapag-Lloyd in most cases do not yield the most economical alternative to the shipper. Thus, the competitive environment within which Portsmouth is competing is one in which door-to-door service provided by carriers calling at New York, Boston, and Montreal can often offer comparable or less expensive transportation to and from the Portsmouth region.

In addition, given sufficient cargo volumes by a single shipper or group of shippers, liner companies can be induced to provide even more attractive rates than those presented in the table. Suggesting a greater differential between their rates via New York, Boston, or Montreal and Hapag-Lloyd via Portsmouth.

Service Contracts

The major impact of the Shipping Act on ocean freight rates has been the service contract. Historically, ocean carriers were

Table A-1

SELECTED PORT-TO-DOOR CONTAINER RATES

1985

	From	To	Via Canadian/U.S. North Atlantic Ports				Via Portsmouth
			Sea-Land	Cast	U.S. Lines	TFL	Hapag-Lloyd
Exports							
Apples or Fruit	Portsmouth, NH	Rotterdam	$2,172	NA	$2,172	$2,172	$1,982
Paper--Newsprint in Rolls	Portsmouth, NH	United Kingdom	1,810	2,630	1,980	2,080	1,872
Imports							
Beer--Cases of Bottles or Cans	Rotterdam	Nashua, NH	$1,998	NA	$1,998	$2,067	$2,052
Scotch Whiskey--Bottles	Glasgow	Nashua, NH	2,692	2,700	3,198	2,600	2,948

NA: No applicable rate.

NOTE: All rates are for 20-foot containers except newsprint which are for 40-foot containers.

Source: TBS interviews with carrier marketing representatives.

required to offer the same port-to-port rate for the same commodity to all shippers. The Shipping Act of 1984 provides a framework in which conferences and carriers can negotiate service contracts with shippers. These contracts provide shipper-specific rates. The "essential terms" of a service contract include origins and destinations, commodities, minimum quantities of freight revenue committed by the shipper, contract rates, carrier or conference service commitments, and liquidation damages for non-performance.

Contract rates benefit ocean carriers, inland carriers, and shippers. Ocean carriers benefit from increased volumes of regularly scheduled shipments at guaranteed rates, all of which enhance equipment utilization and decrease carriers' fixed costs. Inland carriers, whether rail or truck, receive similar benefits. Shippers benefit from improved service and lower costs. Even shippers whose annual volumes are insufficient to qualify for contract rates have been able to realize a portion of the benefits such rates offer through the use of consolidation services.

By September 1985, approximately 2,100 service contracts had been filed with the FMC.

Consolidation services encompass the combining of multiple shipments into a single shipment for the purposes of obtaining the volume discounts available under contract rates. An agent, usually a freight forwarder or customs house broker, signs a service contract with a carrier. The agent then solicits cargoes whose consolidated volume fulfills the terms of the service contract. The agent passes along a portion of the savings, generally the difference between the contract rate and the rate the individual shipper could have negotiated on his own less the agent's commission, to the shipper.

Although not the original intention of the Shipping Act of 1984, service contracts have reduced rates by between 10 percent and 30 percent, enhancing the popularity of these contracts.

b. Liner Shipping Environment

Overcapacity

The liner shipping industry today faces unprecedented competition and rate cutting. This situation has been brought about by too many ships chasing too few cargoes. Exacerbating this situation is both the large number of orders that have been placed for new, larger, and more efficient vessels and the jumboization of existing ships. A major impetus to recent orders has been the introduction of "round the world" (RTW) services with

the newest generation container ships by U.S. and Evergreen Lines. These services/vessels have further depressed rates, forcing operators to invest in comparable vessels in order to achieve the same transport economies.

The net result has been further increases in the capacity surplus which has further depressed rates. In response to these trends, some carriers have begun to rationalize capacity by forming consortiums, wherein two or more operators pool their vessels in order to rationalize capacity, lower costs, and increase utilization without sacrificing service frequencies or transit time.

Concentration of Control

The quest to reduce costs, principally the fixed costs associated with vessels and terminals, has advanced the trend toward industry concentration. Evidence of this pattern can be observed in an examination of the control exerted by the world's 20 largest container operators:

- As of 1 January 1985, the 20 top operators were in control of 36 percent of the world fleet's shipboard slots; by 1 January 1987 the same operators will control 38 percent.

- The 20 largest operators now control 355 of the world's 910 full cellular container ships or 39 percent of the fleet--these ships, however, represent 60 percent of the world's full cellular container ship slots.

- The top 20 operators control 84 percent of the world's container vessels with capacity in excess of 2,500 TEU and will control all of the 32 ships of this capacity currently on order.

The operations of the top 20 operators are concentrated primarily on the well-established, high volume East-West routes among the world's industrialized nations. The concentration of the liner industry among a relatively few operators has increased their control of cargo routings through pricing mechanisms.

Larger Vessels

The quest for economics of scale has also led the industry leaders to introduce larger ships. On major routes, the reduction in slot cost achieved with vessels of 3,000-4,000 twenty-foot equivalent units (TEUs) has proven to be dramatic. As a result, the pattern of increased ship capacity has taken hold:

- 80 percent of the ships on order for the top 20 container operators are for ships with a capacity in excess of 2,000 TEU.

- Evergreen Line's newest ship series presently being discussed is in the vicinity of 5,000-6,000 TEU;

- American President lines and Sealand will soon breach the 3,000 TEU barrier with newbuildings

The present limit on capacity capable of transiting the Panama Canal is about 4,200 TEU. Without these restrictions, container ship capacity could easily exceed 5,000 TEU, with shore-based support facilities then becoming the limiting factor.

Long Routes and Round-The-World Service

The large ships comprising the fleets of the top container operators represent a significant capital investment. With daily capital costs, including containers, as high as $30,000 for a 4,200 TEU container ship, it is obvious that the utilization of these vessels must be maximized by obtaining full loadings and byminimizing time in port. The latest method of accomplishing these objectives has been through operations on long routes and the establishment of RTW services. Operators offering RTW service have the potential to increase vessel utilization through penetration of multiple high volume routes and reduced port calls. United States Lines and Evergreen, the largest RTW operators, together account for a least 20 percent of total capacity on the highest volume container trades (Europe/Far East, Far East/U.S. East Coast, U.S. East Cost/Europe). Both offer rates between 10 percent and 30 percent below those quoted by traditional and mostly conference operators on these routes, which, in part reflect the economies of scale thereby achieved. Maintenance of service frequencies on RTW services requires a minimization of port calls. Consequently, major liner operators have begun to select load center ports.

Load Centers

The load center concept encompasses the funneling of cargoes along a range of ports into a single port called by the linehaul vessel. The rationale behind the concept is manifold:

- Container terminal, handling equipment, and equipment control systems represent substantial capital investments. By limiting the number of ports in which these

assets are deployed, both capital and operating costs can be significantly reduced

- The less time a vessel spends in port, the greater its utilization and earning potential.

- Few ports can accommodate the draft of the latest generation container ships. This constraint naturally favors those ports with adequate depths and major facilities over those more shallow

The load center concept permits ocean carriers to reduce inland distribution costs as well as vessel and terminal costs. By funneling cargoes through a selected number of ports, ocean carriers increase their negotiating leverage with inland carriers. Ocean carriers can offer substantially greater volumes to these carriers, thereby achieving greater rate reductions than if the cargoes moved via a number of ports. These rate reductions offset the increased costs associated with distributing cargoes over wider geographic areas.

Intermodalism

Taking full advantage of the point-to-point rate making capability provided by the Shipping Act of 1984, major ocean carriers have quickly capitalized on the marketing and service advantages presented to them. An example is American President Lines (APL), an ocean carrier which has purchased rail cars, trucking companies, and inland distribution facilities and established a dedicated intermodal organization. APL has been able to negotiate contracts with the railroads reducing traditional rail freight rates by 25 percent.

Rapidly expanding intermodal operations by ocean carriers has dramatically changed the profile of ocean services at East, Gulf and West Coast ports. For example, traditional all-water services from the Far East to New England have been largely replaced by intermodal operations of transpacific carriers. These carriers route New England cargoes via West Coast gateways and railroads, thus bypassing Atlantic Coast ports altogether. The result has been a significant loss of high-value containerized cargoes by Atlantic Coast and New England ports.

Implications for Portsmouth Port Region

Based on the foregoing discussion, several conclusions can be reached concerning the future faced by the Portsmouth Port Region:

- New Hampshire shippers will have increasing opportunities to obtain lower rates by using carriers who do not call at the Port of Portsmouth.

- Small volume shippers who cannot negotiate intermodal rates will increasingly relinquish the cargo routing decision to forwarders or carriers.

- Portsmouth's role as a feeder port will be maintained only so long as:

  --The Portsmouth Port Community (Port Authority, John T. Clark, Boston Overseas and Portsmouth Navigation) can continue to attract volumes sufficient to offset Hapag-Lloyd's costs to call at Portsmouth.

  --Hapag-Lloyd can continue to offer rates competitive to major operators offering door-to-door service via New York and Montreal.

D. COMPETITIVE PORT ASSESSMENT

1. Overview

An analysis of a majority of New England's small ports shows their facilities and scopes of operations to be similar to those of the Portsmouth Port Region. Each of the ports analyzed handles significant volumes of liquid bulk products, principally industrial and home heating oils and gasoline. These ports also handle a mix of breakbulk and dry bulk commodities destined for or produced by local industries. Providence is the only other small New England port to handle measurable volumes of containerized cargoes.

Of the seven ports analyzed all had terminals available for public use. Two of these, Searsport and Providence, were publically owned and operated. Two, Fall River and New London, were publically owned and privately operated. The remaining three: Portland, New Haven, and Bridgeport, are privately owned and operated. The role these ports play within the New England region is the same as Portsmouth--gateways for raw and semi-finished products consumed in the local economy. Consequently, these ports rarely if ever compete with one another. The principal competition among New England ports occurs for containerized cargoes and is primarily restricted to New York/Montreal versus the New England region in general and Boston in particular. Within the region, Boston competes with Providence and Portsmouth.

2. Ports

Cargo handling facilities at small New England ports are generally equipped to handle commodities in the form of liquid bulk, dry bulk, breakbulk, and containerized cargoes. Liquid bulk shipments include petroleum products, crude oil, molasses, and chemicals. Typical dry bulk commodities include coal, tapioca, fertilizer, scrap metal, salt, cement, and gypsum. Breakbulk commodities include iron and steel products, non-ferous metals, lumber, woodpulp, motor vehicles, and other miscellaneous products.

Principal shipments and receipts through other New England ports during 1983 are shown in Exhibit D-1. Liquid bulk movements dominate. Most of these shipments move through private terminals. Salt is the principal dry bulk commodity moved through the ports analyzed.

A survey was conducted of the following small ports to identify public and private facilities:

- Searsport, ME
- Portland, ME
- Fall River, MA
- Providence, RI
- New London, CT
- New Haven, CT
- Bridgeport, CT

Port directors and other officials were interviewed to determine current and planned improvements to terminals that are available for public use. The results of the survey are described below.

Searsport, ME

A major new terminals on Sears Island for bulk and neo-bulk cargoes is under construction but temporarily halted due to environmental permit requirements. Of the 900 acres on the island, 50 have been deeded to the State for terminal development. Industrial development is planned for the remainder. Expected commodities will include forest and agricultural products. Exhibit D-2 describes the port facilities.

Portland, ME

The cargo terminal at the Maine State Wharf has been converted to a ship overhaul facility that is operated by Bath Iron Works. The new public access terminal is privately owned and operated by P.D. Merrill Industries, Inc. The Merrill Wharf facility handles dry bulk and breakbulk cargoes. Additional open storage is being planned for property owned by Guilford Industries. Further development of the commercial fishing terminal is anticipated. Crude oil imports for pipeline transfer have fallen off as Canadian imports have shifted to the West Coast. Discussions are currently being held with a container feeder operator to serve U.S. and/or Canadian ports. Exhibit D-3 describes the port facilities.

Fall River, MA

The State Pier at Fall River is primarily used as a warehouse and distribution center. A RoRo facility is available but seldom used. There is no breakbulk or container handling capability, nor backup space. The pier is operated by a non-profit organization without tax exemption on a lease from Massachusetts. Exhibit D-4 described the port facilities.

Providence, RI

Providence has a public terminal that handles breakbulk and container cargoes. Multiple stevedores handle the loading and discharge operations. There is limited irregular service with automobiles, steel, lumber, and scrap. Improvements to the facilities are being considered by the city government. Exhibit D-5 describes the port facilities.

In recent years Providence has invested in container facilities and gantry cranes. These investments were made in response to direct calls by the transatlantic container operator Trans Freight Lines (TFL) after their pull out from Boston due to labor troubles and to direct calls by Hapag Lloyd's Yankee Clipper and New York based barge feeder services. Subsequent to the settling of the labor disputes and opening of the Conley Container Terminal in Boston, TFL left Providence and returned to Boston. In addition, Hapag Lloyd has ceased calling at Providence. The foregoing events serve to highlight the risks the port industry faces, i.e., the investment in capital intensive, fixed facilities that cannot follow cargoes.

New London, CT

Two years ago, the State Pier was leased to a private operator, New Haven Terminal Inc., for five years. Irregular service has returned to the terminal with lumber, pulp and copper representing major imports. No new facilities are currently planned. Exhibit D-6 describes the port facilities.

New Haven, CT

The main public access terminal is privately owned and operated by New Haven Terminal, Inc. Liquid bulk, drybulk, breakbulk, and containers are handled. Irregular service delivers imported lumber, steel, zinc, copper and pumice. Scrap is exported. Tankers and tank barges deliver petroleum products and petrochemicals. The operator recently purchased 32 acres from a U.S. Steel plant to be used for open and covered storage. Exhibit D-7 describes the port facilities.

Bridgeport, CT

Principal public access is through privately owned and operated Cilco Terminal Company Wharf for drybulk, breakbulk, and neo-bulk movements. Principal commodities are iron and steel products. There are no known plans for improvements. Exhibit D-8 describes the port facilities.

For comparative purposes, Exhibit D-9 summarizes Portsmouth's cargo handling facilities.

3. Market Advantages

The principal advantages of Portsmouth in competing for containerized cargoes are the specialized service the Port Community can offer, ease of access to/from the Port Authority Pier for delivering/receiving cargoes, competitive service frequencies and transit times to/from the United Kingdom and Continent and the existence of a foreign trade zone. Because the Port of Portsmouth is small, vis-a-vis Boston, New York and Montreal, the Port can offer immediate individual attention to shippers. The unrestricted access of the Port Authority Pier to trucks and the proximity to the interstate highway system are major advantages vis-a-vis Boston, New York and Montreal.

Hapag-Lloyd's service to the UK/Continent via Halifax provides competitive service frequencies and transit times to New York, Boston and Montreal, particularly outbound and provides a

broad range of ports served than service via Montreal. These factors were cited as the second most important criterion by shippers for choosing ports on the Reebie Shipper survey.

The Port Authority's ability to operate a foreign trade zone represents a long-term marketing tool for attracting additional cargoes through the Port Authority's facilities. The foreign trade zone has the potential to offer shipper significant savings in terms of duties and inventory costs. The initial efforts of the Port Authority's marketing person have focused on setting up and marketing the foreign trade zone and these efforts have generated new interest in Portsmouth.

4. Market Constraints

Physical Constraints

The major physical constraint to increasing cargo through the Port Authority facility is the lack of a second berth. The lack of a second berth constrains the Port Authority and John T. Clark from guaranteeing berth availability to new lines or accounts potentially interested in using the Port Authority facility. From the ship operator's perspective, the potential for incurring significant delays at a port due to the lack of a berth is a major criterion in evaluating what port(s) to call.

The importance of delays is increased in today's market where the margins between freight rates and operators' costs is negligible. Each day of delay incurred decreases the earning capacity of the vessel and therefore increases unit fixed costs. In addition, delays can result in the payment of demurrage charges and in the worse case result in contract default.

A second potential constraint to increasing throughput at the Port Authority facility is terminal storage. As cited in Section C, the existing facility is capable of storing 300,000 tons of general (scrap) and containerized cargoes per year. If the volume of containers handled were to increase significantly, competition for terminal storage and berthing space would become constrained. In the short-term, terminal capacity constraints could be alleviated by utilization of off dock storage, assuming vacant land could be located. However, the berthing problem would remain.

A third potential physical constraint to cargo movement is presented by the lift bridges. A mechanical failure, especially in the lower bridge, could both eliminate access to Portsmouth's

commercial marine facilities and trap vessels at the berths above the bridge(s). While this constraint is less important relative to the berth and capacity restraints, it is nonetheless a consideration in evaluating Portsmouth as a port of call.

Economic Constraints

The principal economic constraint to increasing containerized cargoes through the Port Authority facility is the current intermodal rate structure. The introduction of door to door intermodal rates, service contracts, the deployment of larger vessels and the formation of load centers have all served to shift control of cargo routing decisions from shippers to ocean carriers and consolidators. In their ongoing desire to lower costs in response to declining freight rates, carriers are constantly seeking economies of scale. Such actions result in the funneling of cargoes through a selected number of ports in order to increase utilization and thereby lowering fixed costs of capital intensive intermodal assets. The net result has been the introduction of ocean freight rates that are "port blind."

Compounding the problems posed by port blind rates is the lack of high volume shippers within the State of New Hampshire. The New Hampshire market, with the exception of the State Liquor Commission and possibly one or two others, is fragmented. The fragmented nature of the market makes it difficult to generate sufficient volumes through the Port Authority to attract additional services. To date, the volumes have been only marginally attractive to the existing Hapag-Lloyd feeder. Because the market is fragmented, individual shippers are potentially better off using the services of a forwarder/consolidator to achieve lower rates than routing via Portsmouth and Hapag-Lloyd.

An additional economic constraint is the lack of non-conference service via Portsmouth. Traditionaly, non-conference carriers have provided comparable service to conference carriers at discounts of 10 percent to 15 percent. The availability of non-conference service via Montreal and New York, is a further attraction to routing cargoes via these gateways as evidenced by the success of Cast in New England.

Market Constraints

The principal market constraint is the fact that direct ocean carrier service via Portsmouth is limited to the United Kingdom/Continent via Hapag-Lloyd. New Hampshire shippers desiring to ship to/from the Mediterranean, the Middle East Africa or

South America must write their cargoes via Boston or New York or transship via Rotterdam. The latter choice invokes increased transit times and documentation.

A second market constraint is lack of competition, perceived or actual, in Portsmouth. Portsmouth has one stevedore, one towing company and one ocean carrier--one that is conference. This situation suggest that market pressures to keep rates low do not exist, as has been suggested by several interests interviewed by TBS. This perception, whether correct or not, cannot only be dismissed through active marketing efforts by the Portsmouth Port Coummunity that demonstrates Portsmouth as competitive in terms of rates service frequencies and transit times with New York, Boston and Montreal.

Institutional Constraints

Historically, the major institutional constraints to attracting additional cargoes through the Port Authority facility has been the lack of financial support from the State--particularly as it relates to marketing. Historically, the Port Authority has not had a marketing director, nor have funds been provided to fulfill the Authority's mission "to foster and stimulate commerce and the shipment of freight through the States' ports."[3]

Evidence of this lack of marketing function surfaced during the 1983 shipper survey conducted by Reebie Associates. The survey found a very real need to "image-build" Portsmouth among New Hampshire shippers. Comments regarding the lack of container handling capabilities and reliable feedership services amplify the problem.

The State has recently taken a major step to eliminate this constraint by having a full-time marketing person. The individual selected has broad experience in the business of foreign trade which should enhance the effectiveness of the Port's marketing efforts.

5. Market Assessment of Non-Cargo, Alternative Port Activities

Commercial Fishing

Close to 80 percent of the finfish landed in the State of New Hampshire are landed in the Piscataqua River. Over 60 percent of the total finfish landings in the State are unloaded on

[3]New Hampshire Revised Statutes Annotated, Chapter 271-A:Z.

the State Fish Pier of the Portsmouth Co-op on Pierce Island. The Co-op as a six-year old organization has grown consistently since its origin over the past three-year period. The number of Co-op boats and members have grown at approximately 10 percent per year. As many as two to three new vessels in the range of 25-40 feet and over are added to the Co-op's fleet each year. The largest harvest the Co-op has had in its history was 1984 when 5.3 million pounds of finfish were landed at the Co-op's facility with a large representation of many species of both fish and shellfish.

Offshore fisheries are experiencing times of stock depletion, loss of international fishing grounds and pollution of inshore habitats; resulting lower harvest rates have affected most offshore fishing ports. The Co-op has been bringing in species such as pollock, northern shrimp (Pandallas Borealis) and white hake as alternatives to the traditional species at increasing rates each year since its founding. This trend has kept the Co-op as well as New Hampshire fisheries alive and growing. Statistics on fishing activity from a 1977 Sea Grant report comparing present day to 1977 fisheries statistics on numbers of boats and fisherman show significant indications of growth. (4) Numbers of fishermen have increased since the time of the report from 60 full-time fishermen, and 45 helpers in the State, to 150 full-time fishermen and 100 helpers in the River area alone; lobstering has increased from 80-100 part-time lobstermen in the State of 120 lobstermen in the Piscataqua River area alone with a majority of lobstering occurring in the Rye and Hampton/Seabrook areas; boat members have increased from six gillnet vessels to 30-34 vessels at present and from 5 draggers to 30-40 vessels at present utilizing have increased to 30-34 vessels utilizing berthing areas within the River. This growth in fishing activity has been matched with a corresponding growth in the harvest since 1977 represented by overall landing increase from 4.0 million pounds in 1977 to 9.7 million pounds in 1984 (see Exhibit D-10).

Corresponding to the increased harvest has been an increase in the value of the fisheries primarily because of increased market costs and higher consumer demand for fresh ocean fish nationwide. In 1977 ex-vessel value for fish harvest off New Hampshire waters was $1.4 million, in 1984 that value was $3.6 million. This increase in harvest and resulting value has meant increased income to the fishermen and lobstermen and generally increased efficiency of the distribution and marketing of seafood from New Hampshire waters. The value per boat has decreased, however because of increasing numbers of vessels and fishermen. The Co-op in Portsmouth has played an ever increasing role in the growth in this value because of the number of boats that offload at the Co-op pier.

A recent report from the Commonwealth of Massachusetts Division of Marine Fisheries on Massachusetts Fisheries Assessment of Mid-Decade (reports on the condition of fisheries of the coastal waters of the Commonwealth), points out potential problems toward the future expansion of fisheries and shellfisheries in the Coastal areas; some of these factors might affect the New Hampshire fishermen in the future though recent landings have been steadily increasing:

- Excessive fishing--too many fishermen, too many vessels competing for the same resource;
- Ineffective management controls--inadequate planning insufficient limit setting;
- Inshore pollution of coastal and inland waterways;
- Conflict between fisheries--due to increased fishing pressures from offshore fishermen coming into inshore;
- Destruction of habitat and wetland areas--loss of wetlands and intertidal habitat and pollution;
- Loss of major offshore fishing grounds--the result of a fishing ground dispute with Canada.(7)

Evidence of the above problems have shown themselves in Massachusetts fisheries in recent landings of haddock from the Gulf of Maine dropped 50 percent from 1983 to 1984. The percentage of small "pee wee" fish in landings has increased since 1975 with the decrease in the larger more marketable fish, particularly in the winter flounder. Recordings of fish stock show serious declines in coastal species from low recruitment of winter flounder, butterfish, black bass, and longfin squid--showing decreases of 59 percent, 35 percent, 71 percent, 49 percent, and 70 percent, respectively. Fishermen report flounder fishing to be the "worst in 14 years"; "inability to make sufficient money to cover rising costs" (e.g., fuel). Fishermen are spending more time harvesting less fish for less dollar return.(7) Though this report is a Massachusetts report, the same effects are being felt all up the New England coast.

The following table illustrates the volume and value changes in offshore fisheries landings in the New Hampshire coast for the past three-year period. The situation for most species is favorable except for herring and yellow flounder where there have been decreases. More statistics on New Hampshire species are needed for at least five years to detect whether trends have remained steady.

Table D-1
FISH LANDINGS FOR STATE OF NEW HAMPSHIRE
Year 1982-1984

Species	Volume Change (000's lbs.)	%chg.	Value Change (000's $)	%chg.
Codfish	+ 1,307	+ 93%	+ 473	+ 116%
Haddock	+ 111	+ 46	+ 124	+ 91
Flounder-Atlantic	+ 353	+ 22	+ 688	+ 94
Flounder-Yellow	135	- 32	+ 51	+ 28
White Hake	+ 515	+ 292	+ 72	+ 277
Herring	- 1,099	- 86	57	- 85
Oceanperch	+ 63	+ 65	+ 23	+ 96
Pollock	+ 1,380	+ 109	+ 161	+ 68
TOTAL FISH	+ 1,423	+ 17	- 352	- 9
LOBSTER	80	- 14	+ 409	+ 31

Source: New Hampshire State Fish and Game, 1985.

1. Recreational Boating

As we stated in the economic profile draft, the recreational boating uses in the State of New Hampshire and the Piscataqua River itself, have experienced significant growth since the mid-sixties. The growth in personal income and the amount of leisure time available by each household has meant that more time is available for both personal and active recreation for statewide residents. Add to this factor numbers of visitors and tourists to the State each summer (over 230,000) and out-of-state residents (Massachusetts, Maine and other Northeastern states) looking for recreational facilities, and the demand for recreational boating becomes even greater.

Boating statistics from the National Marine Manufacturer's Association have shown national growth rates of over 3 percent a year from the 1970s to the 1980s with a 3.5 percent a year average from 1980 through 1984 with over 13.4 million boat registrations in 1984 alone. Boat registrations are generally for boats with inboard and outboard motors either sail or power for New Hampshire. It is for all "motorboats" within U.S. waters. The State of New Hampshire ranks 51st among the 52 states in numbers of boat registrants in 1984 primarily because of its limited ocean shoreline (131 miles) and limited inland water areas (not that Winnepesauke is small or insignificant in any

respect) (12) A.D.L. (1981) stated that boating registrations in the State had increased a rate of 8 percent a year from 1977 through 1981 boating registrations have doubled from 1977 to 1981.(7) From 1981 to the present, boating registrations have increased over 100 percent with a present total registration of 9,242 primarily due to registrations at Lake Winnepesake. Moorings in the state increased at rate of 200-300 percent from the mid-1960s to the 1980s (9) and since the A.D.L. survey in 1981, 10 percent with 1,099 moorings statewide. This growth rate has caused increasing pressures at all waterfront facilities from large waiting lists for marine slips and moorings to overcrowded waterways and overcrowded parking areas in most areas of the State. In the coastal New Hampshire area, there is direct access to the open ocean and coastal cruising so that there are plenty of places for the boater to go to without the crowding experience of inland lake areas. The problem in coastal areas, however is that there is limited waterfront land area available, for recreational boating and limited public access to deepwater channel areas. With an ever increasing conversion of waterfront properties to the "highest and best" uses--or residential/condominium development (e.g., Derby Street Station) more potentially accessible waterfront sites are being lost each year. Furthermore, with minimal investments being made and priorities being set by city or state agencies for waterfront property, renovation for public boating uses, and/or access the situation will only get worse with recorded growth rates. The Prescott Park Marina constructed in 1984 is an exception to this trend.

Tourboat Activity

The market for tourboat operations in the New England area has expanded with the increasing publicity and renovation of the urban waterfront. Cities such as Baltimore, Maryland, and New York, New York, whose waterfronts have experienced a revitalization, now have tourboat operations active in their harbors. As more waterfront users compete for access to the valuable waterfront areas and the urban harbor, more public users will turn to tourboat activities, such as the Viking and Portsmouth Cruises, to provide them access to the waterfront.

The Viking tourboat service has plans to expand operations in the Piscataqua by new boat purchases and facility upgrading. Viking Cruises leased a second vessel during the 1985 summer to specifically test the strength of the tourist market. The additional ship uncovered significant unfulfilled demand for cruise boat activity. Although Viking operated at an average of 50 percent capacity for the season, actual attendance figures this year were up about 20,000 people from just six years ago.

Viking has been successful in proposing that $375,000 (revenue bonds) be contributed for long over-due improvements to the existing pier and buildings; and for a facility expansion which will include Viking support facilities, recreational boat slips (or space for a visiting cruise ship), and a future retail and office complex. Viking has also renegotiated its year-to-year lease into a a ten year contract allowing it to undertake the proposed expansion.

Portsmouth Harbor Cruises has no immediate expansion plans. The Heritage operates at 50 percent capacity in the autumn during fall foliage season. The "Heritage" attracts a more local crowd than does the "Viking Sun."

Cruise Ships

A separate category of tourboat activity, one operating on a larger scale, is the destination point cruise ship which could potentially add hundreds of visitors to the Portsmouth community. The Passenger Shipping Industry Analysis (1983) states "renaissance of many major American cities' waterfront districts such as Arlington, Virginia; Baltimore, Maryland; Charlestown, South Carolina; Savannah, Georgia; and others, would make ideal cruise ports, affording first time and repeat passengers an alternative to the Carribean." According to Standard Marine Int'l Inc. (SMI), in 1982 there were 153 major passenger/ cruise vessels operating worldwide, with as many as 50 incorporating U.S. port destinations. The S.M.I. reports that the North American market continues to be the strongest U.S. cruise trade. (21)

Currently no destination point cruise line activity is taking place in Portsmouth harbor for what appear to be a few reasons: the first involving the difficulties of locating docking space for a passenger ship 500 to 700 linear feet, the second having to do with the limitations of the Jones Act which prohibits a foreign flag cruise vessels from transporting passengers to consecutive U.S. ports. Currently , a number of interested congressmen and Senators (Clayshaw (R), Donald Riegel (D), and Ted Stevens (D) are assisting the cruise line industry to gain an exemption from this rule so that the foreign flag cruise vessel can be used for U.S. coastal cruises.(21)

The Portsmouth Chamber of Commerce and an existing tour boat operator in the harbor have been approached by a Florida firm with a proposal to enter Portsmouth Harbor as part of a regularly scheduled cruise during the summer months. The economic returns from the total passengers (approximately

3,500/season given the proposed size ship) arriving in Portsmouth could add $2,157,000 from direct passenger expenditures, vessel expenditures (including terminal operation employment, local supplies, gasoline,etc) and port revenues. Approximately 40 part-time local staff positions would be needed.(22)

Partyboat and Charterboat Activities

The New Hampshire seacoast has a limited number of party boat operations currently in business during the spring and fall, none of which operates out of Piscataqua River. Hampton Harbor has approximately five party boats operating during the spring and fall, and is the only harbor currently staging partyboat operations. Economic returns to the local economy from the five Hampton party boat operations is $1,118,000 a year, which gives an indication of what a full-time party boat activity could return.(9)

Market research indicates that no plans exist for full-time party boat and charterboat operations in Portsmouth Harbor.

Other Ship Attractions

Additional water-dependent activities that do not belong in the above categories are the visiting ships and submarine museum.

Tall ships visits are not part of the regular schedule, but city leaders are always interested in increasing the frequency of their calls. As the ships continue to gain recognition throughout the New England coast where they make visits, the visitor attendance at each visit should rise.

Another water-dependent activity which will open during the 1986 summer season is the experimental submarine, the U.S.S. Albacore. The submarine has been placed in a permanent, dry dock installation at Albacore Park this spring . The sub will open next year as a maritime museum. The Chamber of Commerce expects attendance to reach 50,000 within a few years of operation which potentially return $1 million to the local economy in the form of entrance fees and direct expenditures.

Tourism

Because tourism is an important contributor to the total economic returns of the State, various attempts have been made to

assess the market characteristics for the state. This report presents the findings of past studies which the study team believes contribute to the correct understanding of the character of the seacoast tourist industry.

The most recent state-wide surveys and seacoast area surveys on tourism were completed in the late 1970s and early 1980s by state agencies and private firms. Highlights of the state and regional studies confirm the following:(24)(25)

- 3/4 of seacoast visitors live in Massachusetts and New Hampshire and other New England states.
- The largest percent of respondents are between the ages of 34-49.
- Nearly 1/4 all surveyed are under age 18, suggesting that many visitors arrive in family groups.
- Nearly half of seacoast surveyed visitors report family incomes over $20,000 which is $5,000 greater on average than family incomes reported by state-surveyed visitors.
- Primary reasons cited for visiting the state are friends and relatives, outdoor recreation, sightseeing and business, and shopping, especially in Portsmouth area.
- Average visitor trip duration for the seacoast area is less than the state average (3-5 nights) indicating a proportionately greater number of day-trippers visit the seacoast.
- Seacoast visitors are less likely to spend on lodging and more likely to spend on restaurant and and entertainment.

The only summary which can be safely drawn from prior studies is that the typical Portsmouth area visitor is a 35-49 year old, earns an above state-average family income of $20,000 or more, lives in New England, travels to the seacoast during the summer rather than the winter, and is probably less likely to stay overnight and more likely to be on business travel than his counterparts visiting other areas of the state.

Perhaps the least researched aspect of the tourist industry is the specific growth patterns of the tourist market in the state. The State Office of Vacation and Travel measures the

general growth of the tourist industry in the state by tracking the amount of business it channels to the regional councils. The state office reports that recently the region experiencing the largest percentage growth has not been the seacoast region, but instead has been both the mountain and lake regions in the state.

More specific evidence of grow patterns of the tourist industry lies with the tourist attractions themselves. Unfortunately the tourist attractions surveyed in the Economic Profile section of this report provide mixed signals as to the overall growth of the industry.

Within the Museum/Theater category, the general growth indications are mixed. Strawberry Banke's attendance figure of last season was slightly off due to a generally poor year New England-wide for historic sites visits. The management indicates that this year's attendance figure is lower than last's because last year Strawberry Banke spent more on advertising and boosted its list of events in preparation for their 25th anniversary.

The Theater by the Sea, however, experienced a record season between 1984-1985. Subscription sales of 4,900 are up substantially from last year, and one more play was added to produce an 8 play season, adding approximately 20 more shows and 10 additional production people, actors, actress (part-time). Shows play to an average of 70%-80% capacity, which is up from an average of 65%-75% when the theater first opened.

The Children's Museum has experienced unprecedented growth in its first three years of operation. The 1984-1985 year's attendance represents 5,000 children more than last year. The Children's Museum is now involved in it second building fund drive to raise $200,000 in pledges for enlarging of performance space, workshop space, and expanded museum shop space. Additional space is needed as there have been waiting lines several times a month when the 50 child capacity of the museum was reached.

The Portsmouth Music Hall is in its first year of operation so growth patterns have not yet been established.

Attendance at the Festival/Fair attractions has remained at generally high levels over the past one or two years. The Market Square Day and Bow Street Fairs have continued to attract similar high levels of visitors each year, but future growth in direct expenditure returns for retail activities such as these is contingent on disposable income and traditional tourist season irregularities. The outdoor entertainment event, Prescott Park

Arts Festival, which increased its attendance about 8,000 from last year, is not subject to the growth restraints of the retail fairs.

Bus Group activity is still a relatively untested activity for the Portsmouth Harbor area. Since bus groups are a destination point activity, their frequency will increase with the increase in available resort-type lodgings such as the new hotel, in addition to better advertising of the opportunity.

Residential and Commercial Outlook

A recent report on the reuse of the Portsmouth Hospital Foundation Properties reviews the present market situation for housing, office space and general development in the Portsmouth area. We are utilizing the results from this survey to serve as a base for an examination of a general development scenario for the waterfront to reflect the often quoted "highest-and-best" use of waterfront properties.

Population rates for Rockingham County and Portsmouth proper are projected to grow at the following rates:

Table D-2

	Rockingham County	% Chg.	Portsmouth	% Chg.
1981	198,500	4.4	26,400	0.7
1990 (26)	221,215	11.4	27,887	5.6

The office/commercial/retail and general housing industries should absorb the major increases in the labor market which future population growth will produce. Within the Portsmouth's three industrial/commercial parks, over 2-million square feet will be added a year for the next five years to accommodate light industry and commercial growth.

Over the past six years, Portsmouth has experienced a growth of 428,000 square feet of office space with 71,000 square feet per year on the average with 70 to 80 percent of the growth occurring in Portsmouth and the balance of growth in Hampton and Newington. Currently in Portsmouth there are 101,000 square feet of office space available with over 400,000 square feet planned for the next three years; if this growth rate continues, office demand could double in the next 10 years. Development could

outstrip demand unless office users are attracted from outside the region (27).

More than 2.5 million square feet of retail space have been added to the City of Portsmouth in the past 15 years as shopping centers. The State of New Hampshire was the leader in retail sales growth in the Northeast with a gain of 206 percent from 1970 to 1980 (see Table D-3).(27)

A majority of the growth in retail sales has come from an influx of people from outside New Hampshire shopping in New Hampshire--the growth of this tourist trade will be presented in another section.

The residential housing market in the Seacoast area has been aggressive in the recent past because of the general increase in economic activity, low interest rates and the renovation of areas such as downtown Portsmouth and the active construction of condominiums. In 1984, there were 167 transactions through the Multiple Listing Service which handle 85 percent of all transactions.(26) The trend has been a propensity toward condominiums and multi- family houses with a decrease in number of persons per dwelling and a significant increase in housing values, with 75 percent to 100 percent appreciation rates in the past five years.(27)

The following table shows the characteristics of the Portsmouth housing market in 1980:

Table D-3

Total Units	Owner occup.	Renter occup.	Vacant f/sale	Vacant f/rent	Other
10,300	42.6%	52.1%	0.3%	3.1%	1.9% (33)

This table shows the low average vacancy rate and thus the demand for new housing. Of the condominiums in the Portsmouth area, original prices of $80-$85/ft have resold as $115/sq ft with prices high as $150/sq ft being achieved in the marketplace. Cedar Ridge and Maple Hill, planned unit developments with 1,000 and 1,200 sq ft of space have sold for $70-86,000 a unit recently.

Waterfront properties sold to a hotel group above the Port Authority site and the Daniels Street Station have tested the waterfront market recently at $20 million and $16 million

construction values, respectively. The hotel is a 150 rooms hotel with five stories, and residential condos. The hotel will relate directly to the waterfront with plans for a tie-in to the tourboat facility. Assessed value of the hotel will bring the city over $400,000 a year with the tax rate of $27.26/$1,000. The Daniels Street Station on 1.6 acres of land will bring $270,000 to the City's tax base.

E. SURVEY OF EXISTING LAND USES

1. Background/Methodology

In order to understand the potential for development of the Portsmouth Harbor, it was necessary to conduct an inventory of the land uses along the Portsmouth Port region waterfront. The area covered included the New Hampshire waterfront from Fort Point in Newington to the Fort Stark State Historic Site in New Castle. In addition, certain backchannels were included. Waterfront areas with less than 5 feet of water depth at mean low tide or areas subject to other navigational constraints were excluded from the inventory process.

The inventory was completed by securing the tax maps in each of the three municipalities and by on-site visits. Data sheets, a sample of which is shown in Exhibit E-1, were prepared which contained the owner's name(s), the map and lot number of the relevant assessor maps, the zoning of the parcel, a description of the land use, the linear front feet of waterfront, and an overview description of the constraints, opportunities, and/or conflicts of the present use or proposed use.

In order to prepare the data sheets, several sources of information were used. The municipal tax maps were examined, navigation charts were consulted, and an actual field inventory was conducted to determine actual land uses as needed. The constraints, opportunities, and conflicts section was prepared in order to assess where and what types of waterfront activities could potentially occur in the future.

2. Overview of Land Uses

This section provides generalized descriptions of land uses for each municipality. In addition, general observations about the principal constraints, opportunities, and conflicts for future development along the waterfront areas are included.

Town of Newington. With some exceptions in Portsmouth, the Newington waterfront is the principal location of the major water-related industrial land use activity on the New Hampshire side of the Piscataqua River. There are two areas zoned waterfront industrial in Newington which are bisected by a residential area--Patterson's Lane.

According to the Tax Assessor's records, there are approximately 16,900 linear feet of waterfront in Newington. The largest single user is C. H. Sprague, a diversified energy company with numerous fuel storage tanks and related energy production facilities. The company owns almost 20 percent of the shoreline. Other large users include the Public Service Company of New Hampshire--energy production facilities, Belcher New England--fuel storage, and Simplex Company--underwater cable manufacturing. Most of the large scale users have large private piers and dolphins for the on-loading and off-loading of their cargoes.

There are other smaller industrial users along the waterfront including C. E. Avery Co., the Dorchester Sea-3 Company, and the American Trawler Co. These users tend to have smaller waterfront properties even though their backland development tends to be large.

The residential uses tend to be clustered around the end of Patterson Lane and bordering Broad Cove area. For the most part, their water frontage is limited. Only one residence has a waterfront of considerable length, namely 375 feet. The remainder tend to be in the 50-foot range with only two others having frontage in excess of 100 feet.

The principal undeveloped land which is located to the north of Patterson Lane consists of approximately 72 acres and is owned by the Public Service Company of New Hampshire (PSNH). The parcels in combination have some 1,850 feet of water frontage. However, the water depths in the immediate area are in the 1- to 2-foot range with rock outcroppings and tidal wetlands. Such a configuration would require pier development off shore near the channel where water depths are in the 20- to 24-foot range to allow for large scale shipping activity.

Constraints, Opportunities, and Conflicts

The principal constraints in Newington for future waterfront development are the limited availability of possible development sites and the location of residential uses (and recreationally zoned) within the larger waterfront industrial areas. Another

constraint, to some, is the location of a rail line through the area. While it does provide a needed transportation link, it is also located in a way that tends to limit the size and accessibility of some waterfront parcels which potentially diminishes their utility. The opportunity which does exist for waterfront industrial development is generated by the existence of a few relatively large areas with suitable open, level, or gently rolling terrain. In addition, this land does not have a sharp change in grade to the water level. Another favorable factor creating potential development opportunities is the presence of a large area of uniformly zoned land identified with waterfront activity.

City of Portsmouth. Unlike Newington with its relatively homogeneous land uses, Portsmouth exhibits a very diverse land use pattern. It also has a much more diverse topography along the waterfront, some of which is very difficult to develop and use for water-related development activities. Portsmouth is a mature waterfront comprising an intense and well-established development pattern that has been in place for many years, in some cases well over 150 years.

From the northern boundary to the Interstate 95 Bridge, there are two principal land uses, industrial and residential. The largest single user is the Public Service Company of New Hampshire which owns in excess of 4,300 feet of waterfront. This parcel contains Schiller Station Power Station and unloading and storage facilities for fuel. Also, in the vicinty are storage tanks for the C. H. Sprague Company. Southeast of the Sprague property is open land of PSNH which slopes steeply to the waterfront.

A large residential area, Atlantic Heights, occupies approximately 600-800 feet of shoreline northwest of the I-95 Bridge. It is divided into small lots containing single family and duplex housing units. The development is situated on a steep bluff some 25 to 50 feet above the Piscataqua River.

Southeast of the I-95 Bridge the character of the waterfront changes. From the I-95 Bridge to the Route 1 Bypass Bridge the land use is primarily water-dependent, industrial in character. The area includes New England Petroleum's tank farm, National Gypsum's sheetrock plant, and New England Homes, a pre-fabricated homebuilder. The first two uses include pier facilities for off-loading oil products and gypsum rock used in the manufacture of sheetrock.

Below the industrial facilities and near the Route 1 Bypass Bridge is an inlet to the North Mill Pond, a large tidal area.

It provides limited anchorage for small power boats whose airdraft is 5 feet or less in order to provide clearance under the Market Street connector. Also in this area is a tidal wetland behind a railroad causeway.

The area between the Route 1 Bypass Bridge and the Memorial Bridge (Route 1) encompasses a variety of land uses. The northern third contains the New Hampshire Port Authority facility which has some 2,500 feet of waterfront. It contains one pier, two storage buildings, a hardstand area, and a secondary pier which is used for a harbor and island cruise boats. Downriver from the Port Authority is the Granite State Mineral facility, a privately owned shipping facility that imports road salt. It encompasses approximately 670 feet of river frontage.

From Granite State Mineral southeastward to the Memorial Bridge is a variety of mixed commercial uses, many of which are not water related. Three water related uses are a harbor cruise line, a staging area for lobster fisherman, and the Portsmouth Navigation Company which provides tug and pilotage services for all of the Piscataqua River. Other typical uses include water-front restaurants, apartments and condominiums, specialty shops, offices, and the Theatre-by-the-Sea. A major new office complex with residential condominiums and restaurants is currently being developed at the site of an abandoned power plant next to Memorial Bridge.

South of Memorial Bridge the land use character again changes. After the Pier II restaurant which has docking facilities, there is the city-owned Prescott park and gardens. Docking facilities for pleasure boats were recently expanded. They are intended for short-term users. There is also a wharf used for fishing.

Across the inlet from the park is a large city-owned island, Pierce Island, on which is located a State developed and run fishing pier. The site contains an ice house and storage and office areas. Although the city's sewage treatment plant is at the far end of Pierce Island, the island is primarily known for its recreational land uses including a large swimming pool, a boat launching ramp, playground equipment, and picnic areas. Four Tree Island, a picnic area, is accessible by foot from Pierce Island.

To the South of Pierce Island is a large area known as the backchannel area which contains a variety of land uses. The backchannel area encompasses the water area between the Portsmouth shoreline, New Castle Island, and the Town of Rye. It contains several uninhabited islands including Pest Island,

Leach's Island, Clampit Island, Blunt's Island, and Lady Isle. Lady Isle Island contains a private parochial school. Several islands have private residences. With the exception of a very narrow backchannel (4 feet deep and 60 feet wide) that connects the Piscataqua River with the Atlantic Ocean, most of the backchannel area is an exposed tidal wetlands at low tide.

The principal land uses on the Portsmouth side between Pierce Island and New Castle Avenue are residential, restaurants, and small scale lobster pounds and fishing activities and associated docks or piers. There is also a marine research laboratory in the area.

Constraints, Opportunities, and Conflicts

The constraints, opportunities, and conflicts in Portsmouth are considerably different than in Newington. They are described by community segment as follows.

From Gosling Road (Newington line) south to the I-95 Bridge, the principal constraints are physical since the change in grade from land to water is relatively steep. Additionally, currents during the tidal changes are very rapid (up to 8 knots) in this area of the river. The final constraint is the already developed residential land use and zoning pattern. The rail line also limits water access. The opportunity areas are the undeveloped PSNH land and limited City of Portsmouth land under the I-95 Bridge. Conflicts to intensive water related industrial development include existing land uses and residential zoning.

From I-95 to the Route 1 Bypass Bridge, the principal constraints are the topography, tidal wetlands, and the two existing large waterfront users. This area is also one of the areas of greatest opportunity. The tidal wetlands (behind the railroad causeway) could either be filled for a hardstand area to expand the Port Authority, or could be dredged for a small power boat marina. The waterfront area could be similarly used for additional dockage by filling and/or dredging activity. The principal conflict is the environmental sensitivity of the tidal wetlands.

Between the Route 1 Bypass Bridge and the Memorial Bridge, the principal constraints are the size and the intensity of development of the land uses. Aside from the Port Authority and Granite State Mineral properties, the sites are very small (less than 1 acre) and already developed for uses that are generally not water-related, but are water-enhanced. Furthermore, the change in grade in the southern one third of this segment prevents any significant water-related land uses (except

for the former power station). The principal opportunity site is the Port Authority. It has a large pier (see the Port Facilities overview) and hardstand area used for industrial shipping purposes.

From Memorial Bridge along the river to Shapleigh Island, most of the land is owned by the City of Portsmouth--the South End residential area being the exception. The city's ownership provides both opportunities and constraints. The constraints are the establishment of parks and recreational areas. Additional constraints are presented by tidal wetlands at low tide south of the Pierce Island Bridge and on New Castle Avenue as well as the New Castle Avenue Bridge which limits vertical clearance to 10 feet. The opportunities include expansion of the State Fish Pier and, with dredging, additional moorings to the south of Pierce Island in the area that now is a tidal wetlands at low tide. However, pursuit of these opportunities would require a reordering of current public sector priorities.

The principal conflicts are land use, zoning, and development priority. Hearings in the past have exhibited a public preference for low-intensity, passive recreation on Pierce Island rather than an active marina or recreational boating development. This is in part due to the rapid tidal flow and in part due to the restricted vehicular access via the South End to Pierce Island and the effect increased traffic would have on the South End.

Town of New Castle. Moving eastward down the Piscataqua River from Shapleigh Island, is Goat Island which is part of the Town of New Castle. The land uses in New Castle are primarily residential with some lobster fishing and yacht club facilities.

Also on New Castle Island at Fort Point is the U.S. Coast Guard Station and the historic Fort Constitution. From Fort Point to Jerry's Point, which is now the Fort Stark State Historic Site, the land uses are either residential (principally single family) or public in nature. The public uses are the Town owned beaches and parkland reclaimed from the federal government following World War II when they were used to defend Portsmouth Harbor. In general, there are a few large land holdings, both public and private, with additional small waterfront lots for residential use.

Constraints, Opportunities, and Conflicts

From the western end of New Castle to Fort Point, the principal constraint is that the waterfront is completely developed with mostly historic homes. In addition, there are grade problems and rocky outcrops in several areas of the shoreline. Furthermore, there is limited water area between the channel and the shoreline. In terms of opportunities, there are two cove areas which have low water depths and some exposed tidal wetlands at low tide. They are both used as mooring sites for recreational craft. These areas could potentially be expanded through dredging to accommodate additional craft. However, access from land would be a problem since the Portsmouth Yacht Club is presently the only feasible method of access, and it is severely constrained in terms of available land to support increased activity. The principal conflicts are the tightly developed housing pattern and the high property values which render alternative recreational boating uses unlikely.

From Fort Point south to the Fort Stark State Historic Site, the principal constraints are again physical in nature. There are extensive rocky outcroppings along the entire shoreline making it an undesirable boat mooring area at least near the shore. Also, this area is open to the Atlantic Ocean. The other conflict is that a section of the shoreline, the Great Common's area, is used as a swimming beach which would conflict with heavy recreational boating activity. Furthermore, residents have indicated a desire not to increase public use and associated traffic in the area. The principal opportunity is that a significant amount of the shoreline is owned by the Town. Thus it could reallocate its priorities toward boating activities (albeit somewhat limited) if there was general support for such activities. See sample land use chart and map shown in Exhibit E-1 and Figure E-1.

Exhibit C-1

MARINE TERMINALS
PISCATAQUA RIVER-NEWINGTON TO SEA

Map ID No.	Name	Principle Use(s)	Berth Length	Berth Depth	Storage	Remarks
1.	Sprague Energy	Receipt and delivery of pretroleum products	700' 780'	37' 35'	1,200,000 barrels	
2.	New England Tank and Fuel Storage Company	Receipt and delivery of petroleum products	300' 700'	32' 38'	450,000 barrels	Used by Dorchester Sea-3, Belcher, Gulf, and Pease Air Force Base
3.	Simplex Wire and Cable Co.	Load underwater cables	690'	35'	N/A	Serves manufacturing facility on site
4.	Public Service Co. of NH-Newington Station	Receipt of petroleum products, occasional bunkering of vessels	250'	37'	550,000 barrels	Used by Mobil Oil Company
5.	Public Service Co. of NH-Schiller Station	Receipt of petroleum products, occasional bunkering	700'	37'	577,000 barrels	Operated by C. H. Sprague & Son Co.
6.	National Gypsum Co.	Receipt of gypsum rock and petroleum products	450'	34'-35'	Approximately 200,000 tons of gypsum rock; 357,000 barrels of petroleum products	Serves manufacturing facility on site; used by Northeast Petroleum
7.	New Hampshire State Port Authority	Receipt and shipment of general cargo and containers; shipment of scrap metal	578'	35'	Approximately 10 acres open storage; 50,000 square feet covered storage	Operated by John T. Clark & Sons; mobile equipment on site includes cranes and forklift trucks
8.	Viking Cruises	Mooring and landing for excursion boats	180'	15'	N/A	
9.	Granite State Minerals Co.	Receipt of salt; occasional receipt and shipment of other commodities and general cargo	300'	32'	Approximately 2 acres of open storage	
10.	Heritage Cruises	Mooring and landing for excursion boats	100'	12'	N/A	
11.	Portsmouth Navigation Co.	Mooring of tugboats and harbor pilot launches	165'	16'-17'	N/A	Provides pilotage and shiphandling services to deep-draft vessels nagivating the Piscataqua River
12.	Portsmouth State Fish Pier	Mooring, unloading, and bunkering of fishing boats	380'	5'-10'	N/A	Portsmouth Fisherman's coop on-site
13.	Normandeau Associates	Mooring environmental research boats	30'	5'	N/A	Offices and labs located on-site

N/A = Not available.

Source: Port of Portsmouth Handbook, 1983-1986; The Ports of Portland and Searsport, Maine, and Portsmouth, New Hampshire, U.S. Army Corps of Engineers, 1985.

Exhibit C-2

FISH LANDINGS FOR THE STATE OF NEW HAMPSHIRE DURING 1984

Species	Total		Price per Pound
	Thousands of Pounds	Thousands of Dollars	
Alewives	51	54	0.100
Bluefish	18	1	0.055
Cod, True	2,518	880	0.349
Cusk	98	26	0.265
Flounder, Black	207	91	0.439
Flounder, Fluke	2	1	0.500
Flounder, Yellow	283	134	0.473
Flounder, Atlantic	1,990	1,416	0.711
Haddock	354	260	0.734
Hake, White	691	98	0.141
Halibut	2	4	2.000
Herring, Sea	181	10	0.055
Mackerel, Atlantic	16	3	0.187
Ocean Perch, Atlantic	160	47	0.293
Pollock	2,648	395	0.149
Sharks, Unc	2	1	0.500
Tuna, Bluefin	5	13	2.600
Whiting	140	19	0.135
Wolffish	62	6	0.096
Fish, Other	253	142	0.561
Total Fish	9,681	3,552	0.367

Source: New Hampshire State Fish and Game, 1985.

Exhibit C-3

SUMMARY OF NEW HAMPSHIRE LOBSTER LICENSES
AND REPORTED LANDINGS

1969-1984

Year	Total Landings (pounds)	Licenses	Commercial[1] Landings (pounds)	Over Five Traps Commercial Licences	Recreational[1] Landing (pounds)	Five Traps and Under Recreational Licenses
1969	374,486	305	370,239	206	4,247	99
1970	393,059	372	388,031	237	5,208	135
1971	362,832	359	359,446	244	3,386	115
1972	310,255	339	307,597	237	2,658	102
1973	283,799	363	281,661	262	2,138	102
1974	265,564	434	263,539	307	2,025	127
1975	402,521	491	398,019	358	4,052	133
1976	402,505	505	399,124	382	3,381	123
1977	502,495	456	499,482	347	3,013	109
1978	426,789	330	423,475	239	3,314	91
1979	489,687	342	484,527	235	5,160	107
1980	777,341[a]	313	675,366	207	7,011	106
1981	802,432[a]	443	682,670	302	8,997	141
1982	743,311[a]	476	648,891	323	7,616	153
1983	753,288[a]	485	745,291	337	7,997	148
1984	575,377[a]	445	569,080	307	6,297	138

[1]Source: Required annual reports 211:35. New Hampshire State Fish and Game, 1985.
[a]Combined total of commercial and recreational landings from annual and monthly records.

Exhibit C-4

NEW HAMPSHIRE COMMERCIAL FISHING STATISTICS

Year	Landings					
	Quantity (thousands of pounds)			Value (thousands of dollars)		
	Finfish (1)	Lobster (2)	Total (3)	Finfish (1)	Lobster (2)	Total (3)
1977	4,001	499	4,500	1,473	998	$2,471
1978	4,862	424	5,286	1,750	848	2,598
1979	7,495	485	7,980	3,327	970	4,297
1980	19,050	675	19,725	5,182	1,350	6,532
1981	7,690	683	8,373	4,162	1,366	5,528
1982	7,586	649	8,235	3,776	1,298	5,074
1983	8,940	745	9,685	2,517	2,235	4,752
1984	9,681	569	10,250	3,552	1,707	5,259

Source: New Hampshire State Fish and Game, 1985.

Exhibit C-5

COMMERCIAL FISHING--ECONOMIC RETURN FROM LANDINGS

1984

Activity	Ex-Vessel Value				
	Total Pounds New Hampshire (thousands)	Total Pounds Portsmouth (thousands)	Price per Pound (dollars)	Ex-vessel Value New Hampshire (mill dollars)	Ex-vessel Value Portsmouth (mill dollars)
Commercial fishing					
Finfishing	9,681.0	8,229.0[a]	$ .30	$3.6	$3.00[a]
Lobstering	569.0	228.0[b]	$3.00	$1.7	$ .68[b]
Total ex-vessel value				$5.3	$3.68

Activity	Marketing Value		
	Market Value of Portsmouth Seafood (mill dollars)	Percent Remaining in New Hampshire	Net Value (mill dollars)
Finfishing	$12.0[c]	5% (est.)	$0.60
Lobstering	0.9[d]	25	0.23
Total marketing value	$12.9		$0.83

[a] 85 percent.
[b] 40 percent.
[c] $1.50/lb average.
[d] $4.00/lb average.

Source: SEAREACH Corp.

Exhibit C-6

COMMERCIAL FISHING--EXPENDITURE RETURN

Expenditures	Number of Vessels	Return	Percent Remaining in New Hampshire	Net Return
Repairs/Gear				
Less than 25 feet	112	$168,000		
25 to 40 feet	72	144,000		
Greater than 40 feet	42	126,000		
		438,000	25%	$109,500
Storage				
Less than 25 feet	56	10,080		
25 to 40 feet	36	15,552		
Greater than 40 feet	21	15,120		
		40,752	50	20,376
Food Supplies				
Less than 25 feet	112	322,560		
25 to 40 feet	72	207,360		
Greater than 40 feet	42	120,960		
		650,880	75	488,160
Gasoline				
Less than 25 feet	112	336,000		
25 to 40 feet	72	288,000		
Greater than 40 feet	42	210,000		
		834,000	25	208,500
State Fish Pier Fees				
Usage fees (ice, bait)		4,543		
Berthing fees		15,121		
		19,664	100	19,664
Total Potential Return		$1,983,296		
Total Return to New Hampshire				$846,200

Source: SEAREACH Corp. estimates based on typical port activity (approximations for comparison purposes only).

Exhibit C-7

RECREATIONAL BOATING INVENTORY

PORT OF PORTSMOUTH

(Piscataqua River-Little Harbor-Newcastle to Great Bay, Newington)

	New Hampshire Side	Maine Side	Totals
Public/private Moorings	750	400	1,150
Public Facilities:			
Guest moorings	2	4	6
Transient slips	25	0	25
Dock space, feet (approximate)	800	500	1,300
Foot ramps	8	2	10
Public Facilities	1	1	2
Transient Facilities (showers, head, laundry, storage)	0	0	0
Harbormaster	3	1	4
Harbor Police			

Source: SEAREACH Corp. interviews, published data.

Exhibit C-8

MARINA INVENTORY

Facilities	New Hampshire Totals	Maine Totals
Dockage (feet)	396	550
Slips	217	164
Guest slips	4	
Moorings	63	42
Guest moorings	6	7
Storage:		
Inside	50	15
Outside	500	150
Boat ramps	3	2
Hoists/cranes	4	5
Rails	1	4
Repair	3	3
Chandlery	3	3
Sales	3	2
Gas	3	2
Transient facilities		1
Membership	250	100
Employees (seasonal)	48	38

Source: SEAREACH Corp. interviews.

Exhibit C-9

ECONOMIC RETURN FROM WATER-DEPENDENT ACTIVITIES (PRELIMINARY)
IN PORTSMOUTH HARBOR

Activity	Unit Numbers	Annual Return (dollars)[1]	Percent Staying in Town[2]	Net Annual Return (dollars)[3]
Moorings (all vessels)			100%	$82,800
Public	750	$ 45,000		
Private	63	37,800		
Slips (all vessels)			100	292,950
Private	217	292,950		
Transient activity		22,800	100	22,800
Moorings	6 guests + 20 temporary			
Slips	4 guests + 20 temporary	6,156		6,156
Public slips (Prescott Park)		18,000	100	18,000
Repairs/hardware			25	261,000
Sailing vessels:				
Less than 25 feet	50	25,000		
25 to 40 feet	400	400,000		
More than 40 feet	90	135,000		
Power vessels:				
Less than 25 feet	388	169,000		
25 to 40 feet	288	288,000		
More than 40 feet	18	27,000		
Hauling 500 vessels 30 feet		90,000	20	18,000
Yacht clubs	350	61,250	70	42,875
Storage				
Sailing vessels:				
Less than 25 feet	25	$ 4,500	100	$222,408
25 to 40 feet	200	86,400		
More than 40 feet	45	32,400		
Power vessels:				
Less than 25 feet	169	30,420		
25 to 40 feet	144	62,208		
More than 40 feet	9	6,480		
Expenditures on food and alcohol (power and sail)				
Less than 25 feet	388	124,160		
25 to 40 feet	688	330,240	75	379,680
More than 40 feet	108	51,840		
Expenditures on gasoline				
Sailing vessels:				
Less than 25 feet	50	40,000	25	61,840
25 to 40 feet	400	64,000		
More than 40 feet	90	14,400		
Power vessels:				
Less than 25 feet	338	54,080		
25 to 40 feet	288	69,120		
More than 40 feet	18	5,760		
Brokerage: $5-6 million in sales		$ 500,000 to 600,000		$ 200,000 to 300,000
Total Return		$3,093,964 to $3,193,964		$1,608,509 to 1,708,509

[1]Estimated values based on typical unit expenditures in other New England harbors.
[2]Estimated.
[3]Remaining in Portsmouth.

Source: SEAREACH Corp.

Exhibit C-10

ECONOMIC RETURNS OF WATER-DEPENDENT
AND WATER-ENHANCED ACTIVITY[1]

Activity	Annual Attendance	Economic Return	Employment Permanent Salaried	Employment Seasonal/ Hourly Rate
Tourboats	81,170	2,782,600	2	53
Other ship attractions[2]	21,667	330,005	None	
Museum and theater	(166,736)	(2,726,913)	(27)	(70-80)
Festival and fair	145,000	1,331,750	3	30-50
Bus groups	630	37,000	1	2

[1]Economic return and annual attendance figures were calculated from rate schedules, capacity utilization, operating days, and other revenue data obtained through interviews with water-dependent and water-enhanced users.

[2]Visiting ships, sail training race.

Source: SEAREACH Corp. interviews and supplied data, 1985.

Exhibit C-11

POPULATION CHANGES[1]

1990-1990

1980	Portsmouth	Percent Change	Rockingham County	Percent Change	New Hampshire	Percent Change
1900	10,637	-	51,118	-	411,588	-
1910	11,269	+5.9	52,188	+2.1	430,572	+4.6
1920	13,569	+20.4	52,498	+0.6	433,082	+5.8
1930	14,495	+6.8	53,750	+2.4	465,293	+7.4
1940	14,921	+2.2	58,142	+8.2	491,524	+5.6
1950	18,830	+27.0	70,059	+20.5	533,242	+8.5
1960	26,900	+42.9	99,029	+13.0	606,921	+13.8
1970	25,717	-4.6	138,950	+28.7	737,681	+21.5
1980	26,254	+2.1	190,047	+36.8	919,114	+24.6
1984[b]	28,578	+ 9.0[a]	206,196	+8.5[a]	N/A	-
1990[b]	30,505	+16.4[a]	221,215	+16.4[a]	N/A	-

[1]Source: U.S. Census; data from Army Corps of Engineers: Portsmouth Harbor and Piscataqua River Feasibility Report for Navigation Improvements, 1983.

[a]Percent change from 1980.

[b]State Planning Office.

Exhibit C-12

PORTSMOUTH AREA POPULATION

1960-1983

Location	1960	1970	1975	1980	1981	1982	1983	Percent Growth 1980-1983
New Castle	823	975	962	936	990	895	920	-1.7%
Newington	1,045	798	628	716	776	771	727	1.5
Portsmouth	26,900	25,717	28,345	26,254	26,565	27,996	28,578	8.9
Rockingham County	99,029	138,951	168,031	190,345	193,655	200,141	203,126	6.7
New Hampshire	606,921	737,681	833,697	920,475	931,698	951,001	959,000	4.2

Source: Business and Industry Association of New Hampshire: Economic Draft--Seacost Region, October 18, 1985. 1960, 1970, and 1980 data from U.S. Census; other years' data from New Hampshire Office of State Planning annual estimates.

Exhibit C-13

COMMUTING PATTERNS IN PORTSMOUTH AREA

1980 Census

Resident Town	Number Residents Reporting	Working in Resident Town	Percent Working in Resident Town	Commute Out	Commute out to:				Commute In	Total Working in Town	Commute out to:				Percent Noncommuters Place of Work
					Maine	Massa-chusetts	Vermont	Other States			Maine	Massa-chusetts	Vermont	Other States	
New Castle	394	95	24%	299	26	10	-	4	78	173	16	-	-	-	55%
Newington	329	87	26	242	27	8	-	-	3,789	3,876	642	47	-	9	2
Portsmouth	11,458	7,008	61	4,450	929	329	-	94	11,044	18,052	3,767	310	-	37	39
Other towns	22,721	6,831	30	15,890	956	4,014	11	90	12,867	19,698	623	2,712	-	112	35
Portsmouth Labor Market Area Totals	34,902	14,021	40	20,881	1,938	4,362	11	188	27,778	41,799	5,048	2,774	-	188	34

Source: Business and Industry Association of New Hampshire: Economic Profile--Seacoast Region, October 18, 1985.

Exhibit C-14

ROCKINGHAM COUNTY

Average Employment, Total and Average Weekly Wages

Classified by Industry Group

(Third Quarter 1984)

Industry Group	Units	Average Employment	Total Wages	Average Weekly Wage	Percent Employment
Total	4,912	71,485	$268,422,059	$288.84	100.0
Manufacturing	361	17,190	91,793,155	410.76	24.0
Durable goods	237	11,806	69,422,465	452.33	16.5
Nondurable goods	124	5,384	22,370,690	319.62	7.5
Nonmanufacturing	4,551	54,295	176,628,904	250.24	76.0
Construction	686	6,417	32,053,868	384.24	9.0
Transportation, communication, & utilities	173	2,750	13,838,848	387.10	3.8
Trade	1,781	25,683	63,474,737	190.11	35.9
Financial, insurance, & real estate	319	3,973	17,381,265	336.53	5.6
Services & other	1,592	15,472	49,880,186	247.99	21.6
Local Government	86	6,344	16,131,982	195.61	8.9

Source: Business and Industry Association of New Hampshire: Economic Profile - Seacoast Region, October 18, 1985.

Exhibit C-15

PORTSMOUTH BUILDING PERMITS

Fiscal Year	Number of Permits				Construction Value			
	Res.	Comm.	Ind.	Total	Res.	Comm.	Ind.	Total
1986[1]	-	-	-	-	-	-	-	$50,000,000
1985	335	193	4	532	$15,230,930	$25,717,508	$3,860,560	44,809,998
1984	299	169	7	475	7,217,038	18,246,140	899,800	26,362,978
1983	236	135	3	374	3,811,693	4,255,898	138,500	8,206,091
1982	254	119	12	385	1,674,664	3,098,938	544,000	5,317,602
1981	268	128	18	414	2,136,742	3,520,288	2,609,150	8,266,180

[1]Construction value of building permits for fiscal year ending June 30, 1986, estimate.

Source: Portsmouth Finance Director in City of Portsmouth, New Hampshire: Notice of Sale and Official Statement--General Obligation Bonds, November 1, 1985.

Exhibit C-16

PORTSMOUTH, NEW HAMPSHIRE

ASSESSED VALUATION BY PROPERTY CLASSIFICATION[1]

	Fiscal Year 1986 Assessed Valuation	Percent of Total
Single Family	$239,841,600	32.7
Apartments up to 4 Units	46,671,200	6.4
Apartments over 4 Units	56,219,400	7.7
Total Residential	342,732,200	46.8
Commercial	224,677,800	30.7
Industrial	74,248,100	10.1
Utilities	90,794,600	12.4
Total	$732,452,700	100.0

[1]Vacant land lots have been added to the proper classification based on zoning ordinances.

Source: City of Portsmouth, New Hampshire: Notice of Sale and Official Statement--General Obligation Bonds, November 1, 1985.

Exhibit C-17

TAX RATE COMPUTATION FOR CITY OF PORTSMOUNT

	FY 1986	FY 1985	FY 1984	FY 1983
Estimated Requirements				
General Government	$ 11,209,727	$ 9,880,829	$ 8,867,077	$ 7,738,077
Schools	13,989,000	13,366,307	12,198,215	11,547,000
County Tax	813,470	883,912	782,029	821,366
Capital Outlay	403,886	497,907	479,825	356,347
Debt Service				
Principal	400,000	765,000	765,000	960,000
Interest	73,735	117,718	161,700	203,563
Interest on Temporary Loans	597,000	597,000	455,000	536,000
Veteran's Exemption	115,100	118,050	124,000	120,000
Overlay	460,764	75,000	75,000	38,000
Total	$ 28,062,682	$ 26,301,723	$ 23,908,624	$ 22,320,353
Estimated Revenues				
Local Receipts	$ 3,953,241	$ 3,722,644	$ 3,853,661	$ 3,760,638
Receipts from State	1,850,105	1,579,123	1,777,166	1,939,791
Receipts from Federal Government	2,000,000	2,000,000	1,900,000	1,450,000
Transfer from Surplus	300,000	0	182,731	152,810
Total	$ 8,103,346	$ 7,301,787	$ 7,713,558	$ 7,334,481
Amount to be raised through Tax Levy	$ 19,959,336	$ 18,999,936	$ 16,195,066	$ 14,985,872
Assessed Valuation	$732,452,700	$687,158,610	$661,023,120[1]	$250,181,510
Tax Rate	$27.25	$27.65	$24.50	$59.90

[1]FY 1984 reflects 100% Revaluation.

Source: City of Portsmouth, New Hampshire: Notice of Sale and Official Statement—General Obligation Bonds, November 1, 1985.

Exhibit C-18

SELECTED NEW INDUSTRIES SINCE 1970[1]

Industry	Product/Service	Estimated Employees
Allied-Signal Co. (Wheelabrator-Frye HDQ)	Conglomerate	100
Apollo Computer (HDQ)	Computers	500
Congoleum Corporation (HDQ)	Ships/Bldg. Products	50
Damart Thermawear	Winter underwear	150
Data General Corp.	Computes	1,100
Erie Scientific	Medical Slides	250
Liberty Mutual	Insurance	1,200
Neslab Instruments	Medical instruments	100
Nike Sports	Athletic footwear	225
Novel Iron Works	Steel fabrications	56
Palmer-Chenard Industries	Diaphrams	110
Post Machinery	Box machines	120
Pratt-Whitney	Aircraft parts	1,400
Seabrook Station[2]	Nuclear power plant	3-8,000
Sprague Energy (HDQ)	Oil products	40
Timberland Company	Footwear	100
Tyco Laboratories (HDQ)	Conglomerate	36

[1]Source: Portsmouth Hospital Foundation: Advance Briefing Kit, 1985.

[2]The construction work force has fluctuated in a very wide range, depending on the economics of the project. Ther permanent work force is expected to be about 400.

Exhibit C-19

PORTSMOUTH MAJOR EMPLOYERS[1]

Name	Nature of Business	Established in Portsmouth	Number of Employees
Data General	Computer Manufacturing	1975	1,200
Liberty Mutual	Insurance	1969	1,200
National Sea Products	Consumer Fish Products	1967	375
Erie Scientific	Laboratory Equipment	1977	350
Diaphragm Industries	Molded Rubber	1967	200
Damart Industries	Thermal Clothing	1975	150
Outlet Mall of New England	Retail Stores	1984	150
Post Machinery	Folding Machinery	1976	120
National Gypsum	Gypsum Board	1936	100
Neslab Instruments	Laboratory Equipment	1966	100
Iafolla Instruments	Highway Construction	1938	100

[1]Excluding the City itself.

Source: City Economic and Planning Department in Portsmouth Hospital Foundation: Advance Briefing Kit, 1985.

Exhibit C-20

PORTSMOUTH LARGEST TAXPAYERS[1]

1986

Name	Nature of Business	Tax	Assessed Valuation	Percent of Total Valuation
Public Service Company	Electric Utility	$2,442,219	$89,622,700	12.24
Liberty Mutual Insurance	Insurance	614,869	22,564,600	3.08
Portsmouth Coastal Development Partners	Apartment Complex	269,118	9,875,900	1.35
Portsmouth Partners	Shopping Plaza	225,325	8,268,800	1.13
Omne Partners	Shopping Mall	207,345	7,609,000	1.04
National Sea Products	Fish Products	189,235	6,947,700	0.95
Labrie & Albertsen	Apartment	180,400	6,620,300	0.90
Tamposi & Nash	Industrial Park	158,124	5,802,700	0.79
Spectrum Enterprises	Motels	157,262	5,771,100	0.79
Data General Corp.	Computer Mfg.	154,894	5,684,200	0.78
Exeter Lafayette Trust	Shopping Plaza	139,147	5,106,300	0.70
Patriot's Park Assoc.	Apartment Complex	128,826	4,659,200	0.64

[1]Source: City Economic and Planning Department in Portsmouth Hospital Foundation: Advance Briefing Kit, 1985.

Exhibit D-1

WATERBORNE TRAFFIC AT SELECTED NEW ENGLAND PORTS

1983

	Foreign		Domestic	
	Imports	Exports	Receipts	Shipments
Searsport Harbor, ME				
Salt	107,346	-	-	-
Residual Fuel Oil	456,924	-	-	-
Distillate Fuel Oil	-	-	85,426	-
All Other	41,311	13,082	106,891	13,915
Total (all commodities)	605,581	13,082	192,317	13,915
Portland Harbor, ME				
Crude Petroleum	3,819,476	-	-	131,491
Gasoline	-	-	1,660,073	-
Kerosine	-	-	91,292	-
Distillate Fuel Oil	119,127	-	657,580	89,142
Residual Fuel Oil	850,339	-	78,145	-
All Other	50,680	25,604	230,600	32,705
Total (all commodities)	4,839,622	25,604	2,717,690	253,338
Portsmouth, NH				
Salt	250,837	-	-	-
Gypsum	112,767	-	-	-
Gasoline	-	-	179,899	-
Distillate Fuel Oil	107,532	-	416,328	3,714
Residual Fuel Oil	416,515	-	169,814	-
Misc. Nonmetalic Mineral Production	90,057	-	-	-
Iron and Steel Scrap	-	145,829	-	-
All Other	69,119	106,303	163,025	7,770
Total (all commodities)	1,046,827	252,132	929,066	11,484

(continued)

Exhibit D-1 (continued)

WATERBORNE TRAFFIC AT SELECTED NEW ENGLAND PORTS

1983

	Foreign		Domestic	
	Imports	Exports	Receipts	Shipments
Fall River Harbor, MA				
Coal	-	-	887,949	-
Gasoline	-	-	-	-
Distillate Fuel Oil	132,274	-	270,540	127,485
Residual Fuel Oil	353,472	-	207,554	-
Petroleum Solvents	-	-	227,753	-
All Other	67,255	79	928,440	32,138
Total (all commodities)	553,001	79	2,522,236	159,623
Providence River and Harbor, RI				
Salt	129,263	-	-	-
Gasoline	-	-	2,546,818	-
Distillate Fuel Oil	264,827	-	1,013,360	164,653
Residual Fuel Oil	181,307	-	177,668	-
Asphalt, Tar, Pitches	-	-	230,822	-
Iron, Steel Shapes	119,150	-	-	-
Motor Vehicles, Parts	88,837	-	-	-
All Other	223,658	44,335	313,689	70,755
Total (all commodities)	1,007,042	44,335	4,282,357	235,408
New London Harbor and Thames River, CT				
Molasses	103,083	-	-	-
Distillate Fuel Oil	-	-	114,229	-
Residual Fuel Oil	-	-	587,852	-
All Other	103,784	10,135	180,982	46,470
Total (all commodities)	206,867	10,135	883,063	46,470

(continued)

Exhibit D-1 (continued)

WATERBORNE TRAFFIC AT SELECTED NEW ENGLAND PORTS

1983

	Foreign		Domestic	
	Imports	Exports	Receipts	Shipments
New Haven Harbor, CT				
Alcohols	-	-	86,315	-
Basic Chemicals	-	-	203,051	-
Gasoline	191,187	-	2,704,079	207,404
Jet Fuel	-	-	125,184	-
Distillate Fuel Oil	540,864	-	1,552,383	201,277
Residual Fuel Oil	-	-	1,165,922	141,288
Asphalt, Tar, and Pitches	-	-	88,019	-
Building Cement	-	-	115,725	-
Iron and Steel Shapes	222,147	-	-	-
Copper Alloys	122,992	-	-	-
Iron and Steel Scrap	-	216,792	-	-
All Other	192,452	22,554	103,492	17,215
Total (all commodities)	1,269,642	239,346	6,144,170	567,184
Bridgeport, CT				
Gasoline	-	-	747,586	-
Distillate Fuel Oil	-	-	445,679	-
Residual Fuel Oil	419,722	-	447,599	167,767
Iron and Steel Shapes	416,299	-	-	-
All Other	237,115	2,341	49,635	26,957
Total (all commodities)	1,073,136	2,341	1,690,499	194,724

Source: U.S. Army Corps of Engineers, Waterborne Commerce of the United States, Part 1, 1983.

Exhibit D-2

PORT OF SEARSPORT

		Total	Inbound	Outbound
1983 Traffic	Total Tons	824,895	797,898	26,997
	Foreign	618,663	605,581	13,082
	Domestic	206,232	192,317	13,915
	Major Cargoes	70% liquid bulk movements of gasoline, fuel oil, and related products; 13% salt.		
Waterfront Facilities	Public Ownership/Public Operation/Public Access	o Searsport Pier		
	Private Ownership/Private Operation/Private Access	o Atlantic Terminal Corp. o Bangor and Aroostook Railroad Co. o Shell Oil o Delta Chemicals		
Improvements Planned/Under Construction		$20-25M bulk/neobulk terminal at Sears Island--currently delayed pending EIS.		
Existing Channel Depth		35 feet		
Cargoes Handled		o Irregular dry and liquid bulk service.		

Source: U.S. Army Corps of Engineers, Port Series, 1976 and Waterborne Commerce of the United States, 1983. Telephone interviews.

Exhibit D-3

PORT OF PORTLAND

		Total	Inbound	Outbound
1983 Traffic	Total Tons	7,836,254	7,557,312	278,942
	Foreign	4,865,226	4,839,622	25,604
	Domestic	2,971,028	2,717,690	253,338
	Major Cargoes	98% liquid bulk movements of petroleum, gasoline, fuel oil, and related products.		
Waterfront Facilities	Public Ownership/Public Operation/Private Access	o Ferry Terminal Wharf		
	Private Ownership/Private Operation/Public Access	o Merrill Wharf		
	Private Ownership/Private Operation/Private Access	o Proprietors of Custom House o Ferry System o Willard-Daggett Fish Company o Widgery Wharf, Inc. o Proprietors of Union Wharf, Inc. o J.B. Brown & Sons o George I. Lewis o General Marine Construction Corp. o CIANBRO Corp. o General Electric Company o Portland Pipe Line Corp. o Various Petroleum Companies		
Improvements Planned/Under Construction		Additional open storage is being planned.		
Existing Channel Depth		45 feet		
Cargoes Handled		Irregular service for breakbulk, dry bulk, and RoRo.		

Source: U.S. Army Corps of Engineers, Port Series, 1976 and Waterborne Commerce of the United States, 1983. Telephone interviews.

Exhibit D-4

PORT OF FALL RIVER

		Total	Inbound	Outbound
1983 Traffic	Total Tons	3,234,939	3,075,237	159,702
	Foreign	553,080	553,001	79
	Domestic	2,681,859	2,522,236	159,623
	Major Cargoes	71% liquid bulk movements of gasoline, fuel, oil, and related products; 27% coal and lignite.		
Waterfront Facilities	Public Ownership/Private Operation/Public Access	o State Pier		
	Private Ownership/Private Operation/Private Access	o Charter Oil Company o New England Power Company o Montaup Electric Company o Fuel Storage Company o Fall River Gas o Northeast Products o Tillotson		
Port Planning/Improvements Under Construction		None reported		
Existing Channel Depth		35 feet		
Cargoes Handled		o State Pier: None; RoRo capability exists though no vessels call		

Source: U.S. Army Corps of Engineers, Port Series, 1983 and Waterborne Commerce of the United States, 1983. Telephone Interviews. Fall River Port Authority, Massachusetts.

Exhibit D-5

PORT OF PROVIDENCE

		Total	Inbound	Outbound
1978 Traffic	Total Tons	5,569,142	5,289,399	279,743
	Foreign	1,051,377	1,007,042	44,335
	Domestic	4,517,765	4,282,357	235,408
	Major Cargoes	83% liquid bulk movements of gasoline, fuel oil, and related products.		
Waterfront Facilities	Public Ownership/Public Operation/Public Access	o Municipal wharf with 6 berths		
	Private Ownership/Private Operation/Private Access	o East Side Terminals: --Mobil Oil Corp. --American Oil Company --Gulf Refining and Marketing Company --Several other oil companies --Interstate Navigation Company o West Side Terminals: --Lehigh Portland Cement Company --Promet Marine Service --Lone Star Industries --John J. Hudson --Other petroleum companies		
Port Planning/Improvements Under Construction		o Public terminal improvements under consideration by City government.		
Existing Channel Depth		40 feet		
Cargoes Handled		o Irregular breakbulk, drybulk, and liquid bulk service; principal commodities include: automobiles, steel, and lumber imports and scrap exports.		

Source: U.S. Army Corps of Engineers, Port Series, 1976 and Waterborne Commerce of the United States, 1983. Telephone interviews.

Exhibit D-6

PORT OF NEW LONDON

		Total	Inbound	Outbound
1983 Traffic	Total Tons	598,553	541,953	56,600
	Foreign	211,215	201,080	10,135
	Domestic	387,338	340,873	46,465
	Major Cargoes	55% liquid bulk movements of gasoline, fuel oil, and related products; 22% molasses.		
Waterfront Facilities	Public Ownership/Private Operation/Public Access	o State Pier leased (5 years) to private operator (New Haven Terminal Inc.)		
	Private Ownership/Private Operation/Private Access	o Hess Oil and Chemical Dock o Pfizer Inc. o Dow Chemical o Electric Boat o City Coal Company o Whaling City Dredge o Grace Realty o Ferry Boat System o New London Petroleum o Northeast Utilities o Dahl Oil o Lehigh Oil o Spicer Fuel Company o M. Costa & Son		
Port Planning/Improvements Under Construction		o Permit for dredging the channel to 40 feet.		
Existing Channel Depth		33 feet		
Cargoes Handled		o Irregular breakbulk service at State Pier; principal commodities include: lumber, pulp, copper imports.		

Source: U.S. Army Corps of Engineers, Port Series, 1976 and Waterborne Commerce of the United States, 1983. Telephone interviews.

Exhibit D-7

PORT OF NEW HAVEN

		Total	Inbound	Outbound
1983 Traffic	Total Tons	8,220,342	7,413,812	806,530
	Foreign	1,508,988	1,269,642	239,346
	Domestic	6,711,354	6,144,170	567,184
	Major Cargoes	85% liquid bulk movements of gasoline, fuel, oil, and related products.		
Waterfront Facilities	Public Ownership/Public Operation/Public Access	o Long Wharf Pier		
	Private Ownership/Private Operation/Public Access	o New Haven Terminal Inc.		
	Private Ownership/Private Operation/Private Access	o Wyatt Inc. o Gulf Oil Refining and Marketing Company o Connecticut Refining o Atlantic Richfield Company o Bell Harbor o Exxon o Balsamo Brothers o Talmadge o Amerada Hess o Benedict & Company o Long Island Oyster Farms o East Coast Environmental Service Corp. o United Illuminating Company o Mobil Oil o Fireline Petroleum Supply o Getty Refining and Marketing Company		
Port Planning/Improvements Under Construction		o Corps of Engineers feasibility study for 40 to 45 foot channel		
Existing Channel Depth		35 feet		
Cargoes Handled		o Irregular breakbulk, dry bulk; principal commodities include: steel, lumber, non-ferrous metals, pumice imports and scrap exports		

Source: U.S. Army Corps of Engineers, Port Series, 1976 and Waterborne Commerce of the United States, 1983. Telephone interviews.

Exhibit D-8

PORT OF BRIDGEPORT

		Total	Inbound	Outbound
1983 Traffic	Total Tons	2,960,700	2,763,635	197,065
	Foreign	1,075,477	1,073,136	2,341
	Domestic	1,885,223	1,690,499	194,724
	Major Cargoes	78% liquid bulk movements of gasoline, fuel, oil, and related products; 16% metal products.		
Waterfront Facilities	Public Ownership/Public Operation/Public Access	o Municipal dock (marginal-type wharf) o Recreational piers		
	Private Ownership/Private Operation/Public Access	o Cilco Terminal Company Wharf-dry cargo terminal		
	Private Ownership/Private Operation/Private Access	o United Illuminating Company Docks o Shell Oil Company Dock o R. H. Halcomb o D'Addario Industries o Inland Fuel Terminals o Chevron o City Ice & Coal o Century Resources		
Port Planning/Improvements Under Construction		o Dredging of harbor area under consideration by Corps of Engineers		
Existing Channel Depth		35 feet		
Cargoes Handled		o Irregular neo-bulk, drybulk and liquid bulk		

Source: U.S. Army Corps of Engineers, Port Series, 1976 and Waterborne Commerce of the United States, 1983. Telephone interviews.

Exhibit D-9

PORT OF PORTSMOUTH

		Total	Inbound	Outbound
1983 Traffic	Total Tons	2,239,509	1,975,893	263,616
	Foreign	1,298,959	1,046,827	252,132
	Domestic	940,550	929,066	11,484
	Major Cargoes	62% liquid bulk movements of gasoline, fuel oil, and related products; 11% salt.		
Waterfront Facilities	Public Ownership/Public Operation/Public Access	o New Hampshire State Port Authority--State Pier		
	Private Ownership/Private Operation/Private Access	o Granite State Mineral Company o National Gypsum Company o Northeast Petroleum o Simplex Wire and Cable o Public Service Company of New Hampshire		
Improvements Planned/Under Construction		o Channel improvements by Corps of Engineers and landfill		
Existing Channel Depth		35 feet		
Cargoes Handled		o Petroleum, salt, scrap, general cargoes.		

Source: U.S. Army Corps of Engineers, Port Series, 1976 and Waterborne Commerce of the United States, 1983. Telephone interviews.

Exhibit D-10

NEW HAMPSHIRE COMMERCIAL FISHING STATISTICS

Year	Landings					
	Quantity (thousands of pounds)			Value (thousands of dollars)		
	Finfish (1)	Lobster (2)	Total (3)	Finfish (1)	Lobster (2)	Total (3)
1977	4,001	499	4,500	1,473	998	$2,471
1978	4,862	424	5,286	1,750	848	2,598
1979	7,495	485	7,980	3,327	970	4,297
1980	19,050	675	19,725	5,182	1,350	6,532
1981	7,690	683	8,373	4,162	1,366	5,528
1982	7,586	649	8,235	3,776	1,298	5,074
1983	8,940	745	9,685	2,517	2,235	4,752
1984	9,681	569	10,250	3,552	1,707	5,259

Exhibit D-11

RETAIL SALES BY SELECTED STORE TYPES

1980

	Food Stores	Eat and Drink	Drug and Propr. Stores	Gas and Service Station	General Merch. Stores	Apparel and Accessories	Furniture and Home Furnishings	Auto Dealers	Building and Mobile Homes
Rockingham County	347,477	105,677	25,690	99,994	119,528	52,079	47,330	200,878	80,854
Portsmouth	49,778	29,622	3,865	34,678	15,047	12,047	12,724	59,319	16,188
Portsmouth as percent of county	14.3	28.0	15.0	34.7	12.6	23.1	26.9	29.5	20.0

Exhibit E-1

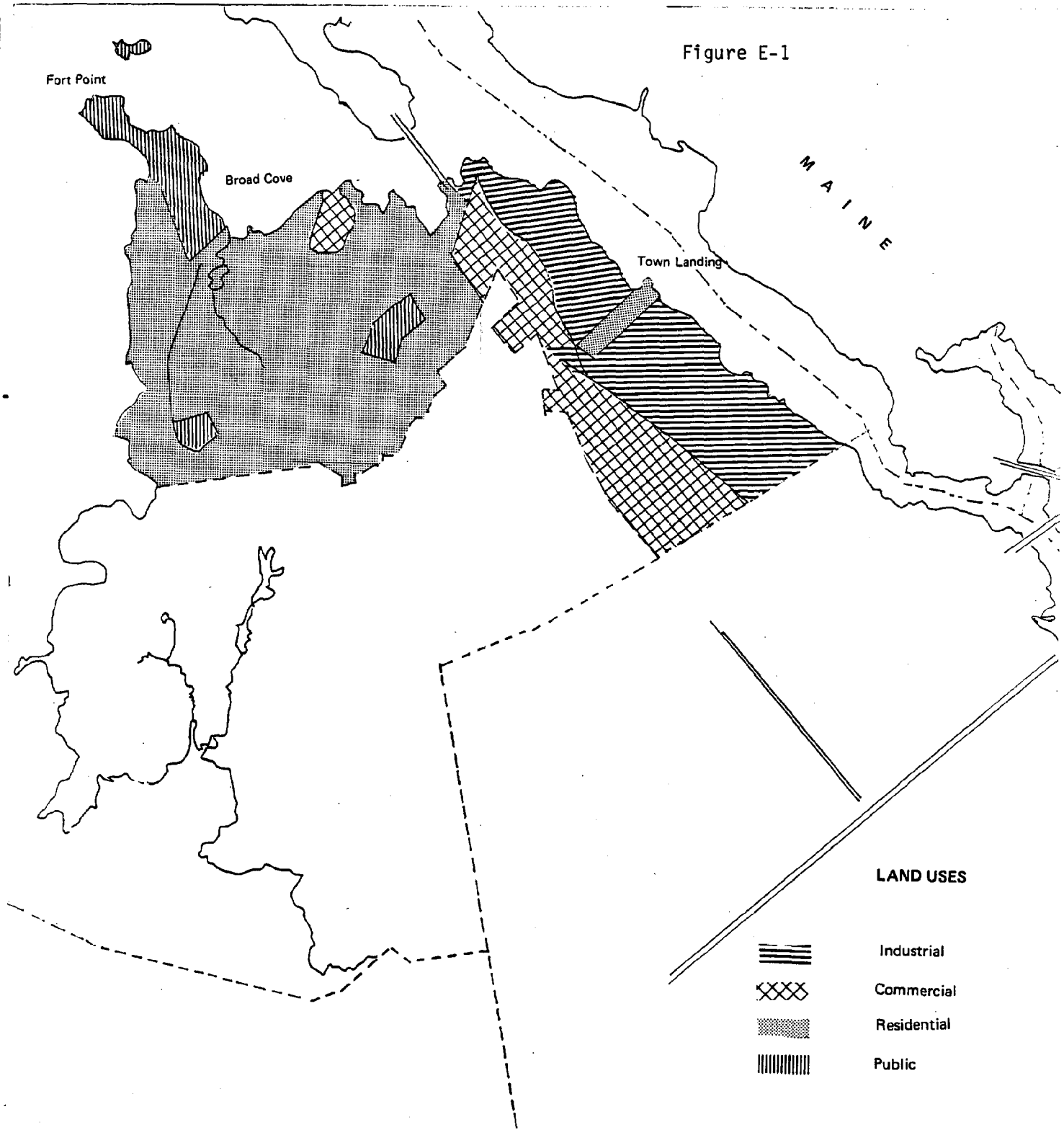
SAMPLE LAND USE CHART

Portsmouth

Owner	Map	Lot	Zoning	Land Use	Waterfront Feet
Bow Street Associates 1 Dock Street Stamford, CT	U-5	2	CBD	Under development, business offices, restaurant, and residential condominiums plus parking garage	408
City of Portsmouth	U-5	3	CBD	Paved site for snow dumping	55
Portsmouth Fish and Lobster Company State Street Portsmouth	U-5	4	CBD	Restaurant, retail seafood sales, mooring space for commercial and pleasure craft	150 (E)
City of Portsmouth	U-4	1	GR	Prescott Park, 25 public slips for docking pleasure craft, recreational fish pier, museum buildings, marine railway	600 (E)

Source: SEAREACH Corp., Theresen Group.

Figure E-1



NEWINGTON

1984

SCALE 0 2400'

1"

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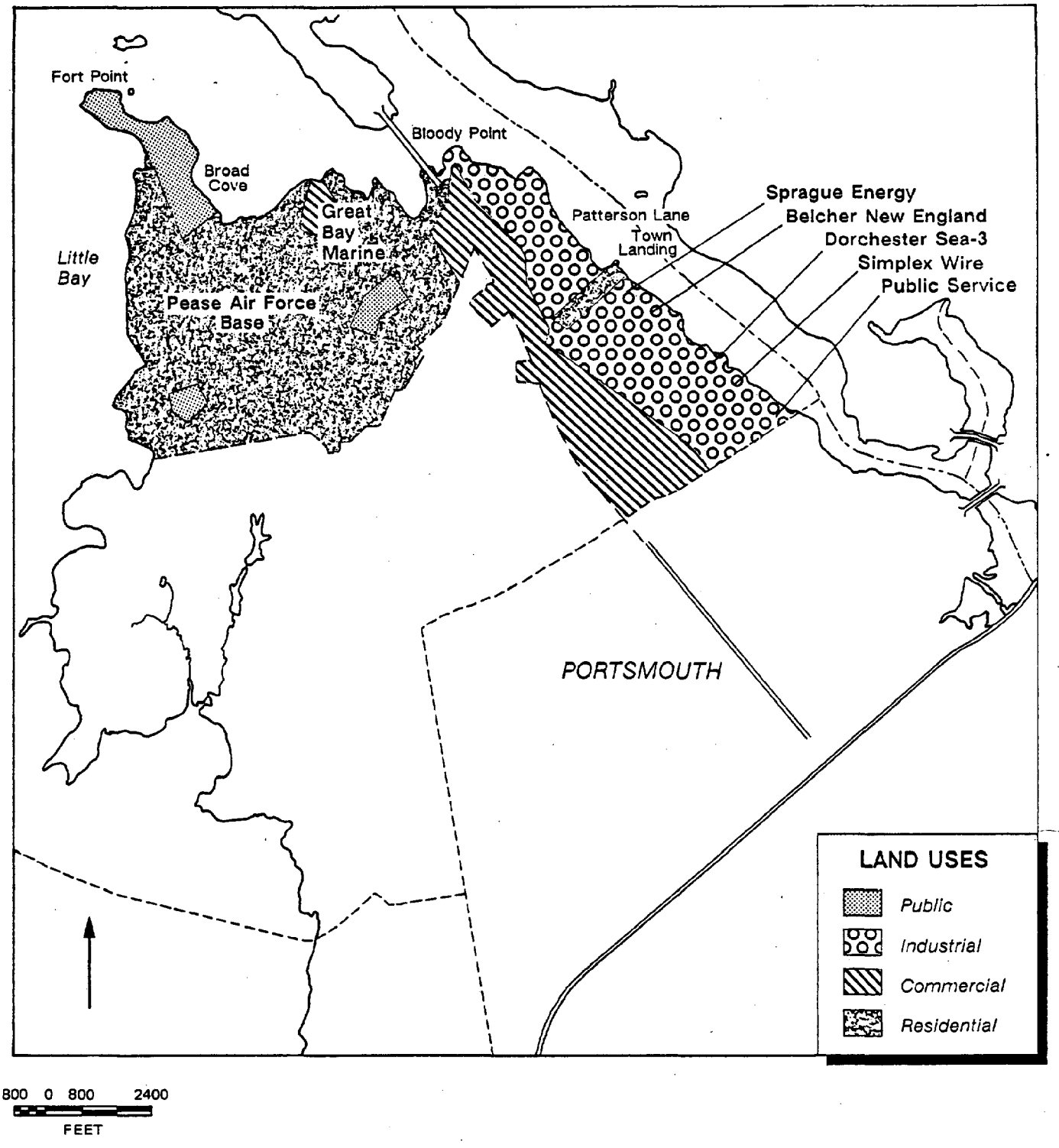
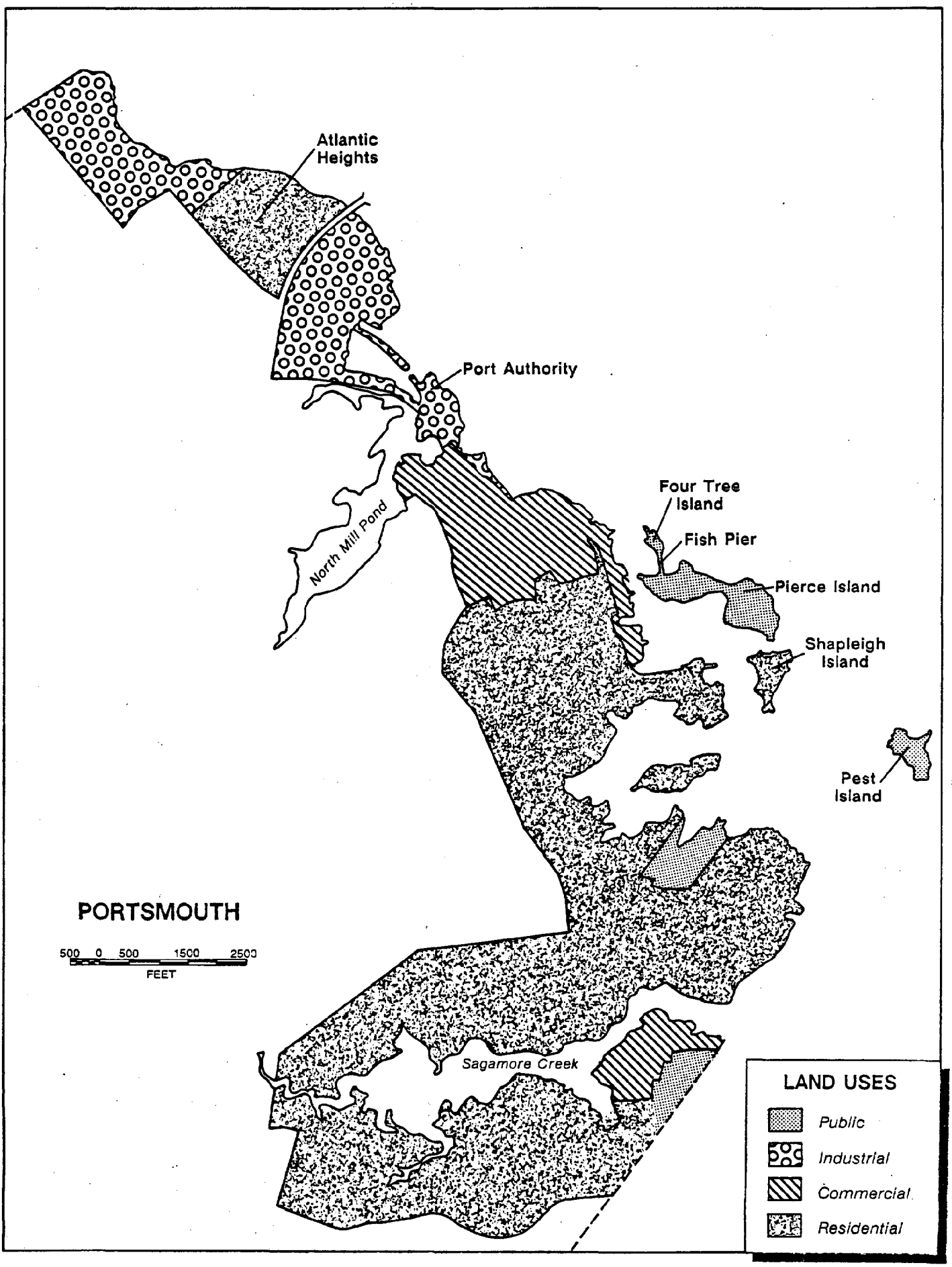
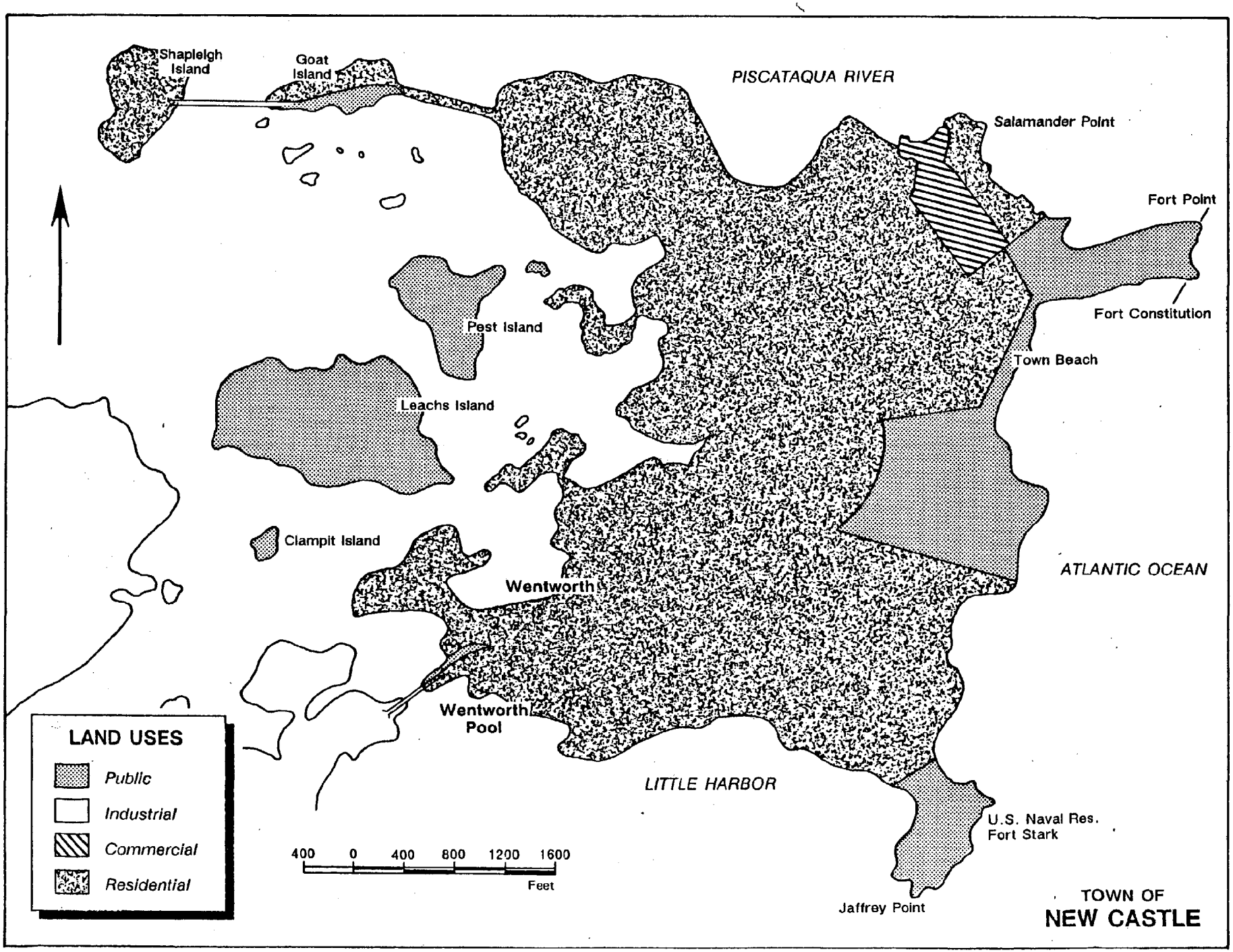



Atlantic Heights
Port Authority
North Mill Pond
Four Tree Island
Fish Pier
Pierce Island
Shapleigh Island
Pest Island
PORTSMOUTH
500 0 500 1500 2500
FEET
Sagamore Creek
LAND USES
Public
Industrial
Commercial
Residential


Shapleigh Island
Goat Island
PISCATAQUA RIVER
Salamander Point
Fort Point
Fort Constitution
Pest Island
Town Beach
Leachs Island
Clampit Island
ATLANTIC OCEAN
Wentworth
Wentworth Pool
LITTLE HARBOR
U.S. Naval Res. Fort Stark
Jaffrey Point
LAND USES
Public
Industrial
Commercial
Residential
400 0 400 800 1200 1600
Feet
TOWN OF
NEW CASTLE